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IN-CAT. #6
65659

NASA Contractor Report 172572

Post-Flight BET Products for the 2nd Discovery Entry,
STS-19 (51-A)

(NASA-CR-172572) POST-FLIGHT BET PRODUCTS
FOR THE 2ND DISCOVERY ENTRY, STS-19 (51-A)
(Analytical Mechanics Associates, Inc.)
149 p

CSCL 22B

N87-20344

Unclass

G3/16 45325

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Contract NAS1-17707
April 1985

Date for general release April 1987



National Aeronautics and
Space Administration

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ABSTRACT

The post-flight products for the second **Discovery** flight, STS-19 (51-A), have been completed and are summarized herein. The inertial Best Estimate Trajectory, BT19D19/UN=169750N, was developed as discussed in **Section I** using spacecraft dynamic measurements from IMU 2 in conjunction with the best tracking coverage available to date for any of the earlier Shuttle entries. As a consequence of the latter, an anchor epoch was selected which conforms to an initial altitude of greater than a million feet. The Extended BET, ST19BET/UN=274885C, incorporated the previously mentioned inertial reconstructed state information and the LaRC generated LAIRS atmosphere, ST19MET/UN=712662N, with some minor exceptions as discussed in **Section II**. Primary and back-up AEROBET reels are NK0165 and NK0201, respectively. This product was only developed over the lowermost 360 kft altitude range due to atmosphere problems but this relates to altitudes well above meaningful signal in the IMUs. **Section III** presents summary results generated from the AEROBET for this flight with meaningful configuration and statistical comparisons from the previous thirteen flights.

MMLE files were generated based on IMU 2 and RGA/AA measurements as discussed in Section IV. Tapes generated were NK0202 and NK0203 for the IMU and RGA/AA, respectively.

Appendices attached define spacecraft and physical constants utilized (Appendix A), show plots of the final tracking data residuals from the post-flight fit (Appendix B), list relevant parameters from the BET at a two(2) second spacing (Appendix C), and retain for archival purposes all relevant input and output tapes and files generated (Appendix D).

Summary flight times and events are given in the following table:

Anchor Epoch November 16, 1984 40300.0 sec GMT
11^h 11^m 40^s

Event	Time from epoch (secs)	Altitude (kft)
Entry interface	1038	400
Initial flight extraction	1179	320
Maximum Mach number (~27)	1276	272
M25	1472	242
M20	1777	217
M15	1980	190
M10	2142	165
M5	2354	118
M2	2534	75
M1	2628	50
Main gear deployment	2877	~0
Weight on wheels (WOW)	2892	-.2
Weight on nose (WONG)	2909	-.2
Stop time	2955	-.2

I. Entry Trajectory Reconstruction

I.a. Dynamic Data

None of the problems that surfaced during the Operational Recorder data reduction for the STS-17 flight were encountered on this flight. Selection of IMU 2 as the dynamic data source for STS-19 was rather straightforward. Though mid-value selection based on the accelerometer measurements indicated IMU 3 was better in the y-component, IMU 2 was selected in the x- and z- directions some 61 and 59 percent, respectively. In terms of total angle as measured by the gyros, IMU 2 represented mid-value measurements 89 percent of the time. Total angular rate mid-value measurements were essentially spread equally across the three IMUs. There were no appreciable data gaps in the OI data, that is, there were none greater than four (4) seconds. Also, there were virtually no manual data deletions required. Clearly the downlist for this flight was much more nominal.

There was some special treatment required for this flight in view of the more lengthy files required to accomodate the additional tracking coverage available. Because of dimensional constraints in the PREIMU software, dynamic data files were divided into two time intervals, processed serially using the spline utility and merged thereafter. Also, though of no major

impact, IMU 3 revealed Euler angle gimbal flips requiring use of a different Euler sequence. Fortunately the software provides for such an alternative as it has occurred previously.

Figure I-1 shows plots of the body-axes derived rates and accelerations from IMU 2 for this flight. The data are stripcharted over 500 second intervals between 1125 seconds and 2892 seconds. The first time conforms to the start of the AEROBET as discussed later. The final time relates to vehicle maingear touchdown. All signal of interest is covered herein.

I.b. Tracking coverage

Tracking data were obtained from four (4) S-band radars and fourteen (14) C-band trackers. This extensive tracking coverage, which included stations from California, Arizona, and New Mexico as well as Pacific and Florida stations, makes STS-19 the best tracked of the Shuttle entries to date. In order to fully utilize the available tracking data, a three (3) degree elevation angle constraint, rather than the usual five (5) degree minimum, was imposed on the passes from Guam (GWMS), California (VDBC, VDSC), and one New Mexico station (WSSC). For all other stations the standard five degree minimum elevation constraint was used. Since cine-theodolite data were not available from the Cape, the end conditions for the reconstructed trajectory were improved by utilizing pseudo altimeter data during rollout and pseudo Doppler data after vehicle stop on Runway 15 at KSC.

Tracking coverages are depicted in Figures I-2 through I-4. Figure I-2 shows the entire ground track for STS-19, with tracking stations shown as annotated. Times and corresponding altitudes at 500 second increments along the track are also given. Annotation for each tracker includes the geographic location and,

in parentheses, the number of trackers at that complex followed by the maximum elevation angle measured at that locale. Detailed tracking coverage is shown in **Figure I-3**. The tracking arcs actually used for trajectory reconstruction are shown by dashed "rays" from the stations to the ground track. Pertinent times and altitudes are also given. An expanded view of the final approach and landing segment is given as **Figure I-4**. Acronyms and locations for the STS-19 trackers are given in **Table I**.

I.c. Reconstruction results

The final BET solution for STS-19, BT19D19, is presented in Table II. For comparison, the initial estimate from the onboard navigation system, the JSC/TRW estimate, and a state-only ENTREE estimate are also given. Comparison of the two ENTREE estimates shows that a significant improvement in the fit to the tracking data is achieved by expanding the solution set to include accelerometer scale factors. The state and attitude for the final solution are in very close agreement with the state only solution, and, the instrument parameter errors are in accord with the 1 sigma performance levels of 100 ppm. There is also very good agreement between the JSC/TRW and BT19D19 solutions both at epoch and throughout the entry trajectory. The weighted fit statistics for BT19D19, based on 7823 observations, are $\frac{\mu}{W} = -0.224$ and $\frac{\sigma}{W} = 1.232$. A summary of the residuals, by station and data type, is given in Table III. Plots of the final residuals are presented as Appendix B. Composite residuals are included in this section. Composite post-fit residuals are given in Figure I-5 (range, Doppler), I-6 (azimuth, elevation), and I-7 (X- and Y-angles). Symbols utilized for the composite residual plots are as follows:

Key to Symbols for Composite Residuals

STATION	SYMBOL
GWMS	○
KMTC	□
HAWS	◇
KPTC	△
VDBC	▽
VDSC	□
MTLC	□
SPKC	◇
WSSC	◇
WHSC	△
HOLC	⊕
MILS	⊕
MLXS	◊
MLMC	▲
MLAC	◀
PATC	⊕
CNMC	⊕
CNVC	⊕

Comparisons of the final BET position and velocity
after rollout on Runway 15 versus survey values are:

End conditions at vehicle stop (Runway 15 coordinates)

	<u>Survey</u>	<u>BT19D19</u>
X,ft	12186	12201
Y,ft	0	23
h-h _{rw} ,ft	16	16
X,fps	0	-.01
Y,fps	0	.20
h,fps	0	.04

Figure I-8 presents plots of the BET during
rollout. Surveyed values are depicted thereon. Vehicle
stop occurs 2955 seconds after epoch.

TYPE	STATION NO.	NAME	GEOD. LAT. (DEG)	LONGITUDE (DEG)	GEOD. ALT. (FT)	MODULUS OF REFR.	SCALE HGT. (M)	MAX ELEV. (DEG)
S-BAND, N-S	1	GWMS	13.31063	144.73681	380.4100	346.	6877.	4.
C-BAND, FPQ-19	2	KMTC	8.71950	167.71837	91.5700	N/A	N/A	49.
S-BAND, N-S	3	HAWS	22.12624	200.33484	3739.3400	317.	6343.	30.
C-BAND, FPQ-14	4	KPTC	21.57210	201.73343	931.4000	N/A	N/A	20.
C-BAND, TPQ-18	5	VDBC	34.66587	239.41865	203.5433	321.	7225.	4.
C-BAND, FPS-18	6	VDSC	34.58276	239.43853	1972.1457	303.	6955.	4.
C-BAND, CAPRI	7	MTLC	32.44172	249.21120	9036.4800	232.	7664.	8.
C-BAND, FPS-16	8	SPKC	31.55683	249.56183	5822.0800	265.	7292.	12.
C-BAND, FPS-16	9	WSSC	33.81391	253.34100	4886.9400	255.	8138.	4.
C-BAND, FPS-16	10	WHSC	32.35810	253.63019	3905.9700	270.	7932.	8.
C-BAND, FPS-16	11	HOLC	32.90151	253.90083	4012.9600	265.	8080.	6.
S-BAND, N-S	12	MILS	28.50827	279.30663	-178.6400	346.	7006.	21.
S-BAND, E-W	13	MLXS	28.50831	279.30727	-183.1400	346.	7008.	33.
C-BAND, MCBR	14	MLMC	28.62609	279.31723	-173.9800	N/A	N/A	58.
C-BAND, FPQ-14	15	MLAC	28.42486	279.33564	-172.0100	N/A	N/A	24.
C-BAND, FPQ-14	16	PATC	28.22655	279.40075	-160.3700	N/A	N/A	16.
C-BAND, MBR-17	17	CNMC	28.52888	279.40982	-195.1800	N/A	N/A	30.
C-BAND, FPS-16	18	CNVC	28.48176	279.42353	-163.9100	N/A	N/A	25.

Table I. STS-19 station locations and refraction data.

EPOCH: 11/16/84 11^h11^m40^s (40300^s) GMT

DATA TYPES: S-band, 4 radars (GWMS, HAWS, MILS, MLXS)
 C-band, 14 radars (KMTC, KPTC, VDBC, VDSC, MTLTC, SPKC, WSSC,
 HOLC, WHSC, MLMC, MLAC, PATC, CNMC, CNVC)
 Pseudo altimeter (Post WONG); Pseudo Doppler (Post STOP)

COMMENTS: 3° constraint on GWMS, VDBC, VDSC, WSSC; 5° constraint all other stations

PARAMETER	Initial Estimate, Nav	Final Solution, BT19D19 (2)	
		BT19D17 (1)	JSC/TRW
v_R , fps	23706.7	23704.2	23704.959
γ_R , deg	-1.190	-1.189	-1.1877712
ψ_R , deg	60.107	60.109	60.106823
h_D , ft	1043495.	1044928.	1044473.3
ϕ_D , deg	-5.039	-5.039	-5.0392872
λ , deg	140.348	140.347	140.34734
ψ , deg	53.713	53.786	53.793444
θ , deg	-70.952	Appendix	-70.961
ϕ , deg	1.675	A 1.597	1.587
μ_w	---	---	-1.503
σ_w	---	---	-0.224
		3.067	1.232

(1) state only

(2) state and accelerometer scale factors { ΔSF_X , ΔSF_Y , ΔSF_Z (ppm) = +23, +73, +16}

Table II. STS-19 solution and comparisons.

OBSERVATION STATISTICS BASED ON FINAL STATE

NO.	STATION NAME	OBSERVATION TYPE	OBSERVATIONS ACCEPTED	AVERAGE WEIGHT.	RESIDUAL	AVERAGE STAND. DEV.	WEIGHTED STAND. DEV.
0	ALTIMETER	86 OF	86	-19148983E+00	-191915120E+00	.89934704E+00	.18736397E+00
1	GWMS RANGE	145 OF	145	.28351037E+00	.34031163E+01	.78600280E+01	.64203117E+00
1	GWMS DOPPLER	145 OF	145	-.49436896E-01	-.46707597E-02	.77986929E+00	.22161494E+01
1	GWMS X-ANGLE	145 OF	145	-.16628034E+01	-.11058532E+00	.82751450E-01	.73463239E+00
1	GWMS Y-ANGLE	145 OF	145	-.91597187E+00	-.10667339E-01	.13654233E-01	.11322559E+01
2	KMTC RANGE	51 OF	51	.13254921E+01	.39928413E+02	.69272484E+02	.22959555E+01
2	KMTC AZIMUTH	55 OF	55	-.72008794E+00	-.82515995E-02	.44311627E-02	.38669189E+00
2	KMTC ELEVATION	55 OF	55	.39413570E+00	.53152891E-02	.75477029E-02	.50490370E+00
3	HAWS RANGE	150 OF	150	-.99422483E+00	-.61880530E+01	.62054521E+01	.95455458E+00
3	HAWS DOPPLER	150 OF	152	-.656191172E-01	-.94369401E-01	.53285561E+00	.14731141E+01
3	HAWS X-ANGLE	151 OF	151	.32171670E+00	.47231098E-02	.19581542E-01	.12475514E+01
3	HAWS Y-ANGLE	152 OF	152	-.16636550E+01	-.19299761E-01	.51690796E-02	.44421661E+00
4	KPTC RANGE	184 OF	184	-.65193393E-01	-.20209908E+01	.11084087E+02	.36484378E+00
4	KPTC AZIMUTH	201 OF	201	.40236714E+00	.46107878E-02	.26576992E-02	.23192801E+00
4	KPTC ELEVATION	201 OF	201	.36418220E+00	.54035033E-02	.62648016E-02	.37712359E+00
5	VDBC RANGE	28 OF	28	-.13392975E+01	-.42587922E+02	.21256442E+02	.666910129E+00
5	VDBC AZIMUTH	28 OF	28	-.54701443E-01	-.626682892E-03	.41101007E-02	.35867395E+00
5	VDBC ELEVATION	28 OF	28	.30415835E+00	.77168088E-02	.72591860E-02	.27919672E+00
6	VDSC RANGE	24 OF	25	.10409974E+00	.32799677E+01	.39613548E+02	.12612319E+01
6	VDSC AZIMUTH	24 OF	25	.61655545E+00	.70652051E-02	.32068135E-01	.27984727E+01
6	VDSC ELEVATION	25 OF	25	-.46750698E+00	-.10994347E-01	.27207191E-01	.11725176E+01
7	MTLC RANGE	51 OF	51	-.13588614E+00	-.41616342E+01	.47095140E+02	.15485199E+01
7	MTLC AZIMUTH	54 OF	54	-.16537599E+01	-.18950693E-01	.21498436E-01	.18760925E+01
7	MTLC ELEVATION	54 OF	54	.28668023E+00	.42786025E-02	.15359505E-01	.99268640E+00
8	SPKC RANGE	34 OF	34	-.13335212E+01	-.40391952E+02	.20744730E+02	.68171398E+00
8	SPKC AZIMUTH	37 OF	37	-.47780671E+00	-.54752616E-02	.57162439E-02	.49883638E+00
8	SPKC ELEVATION	37 OF	37	-.92398474E+00	-.132995306E-01	.11033466E-01	.68588097E+00
9	WSSC RANGE	34 OF	34	-.91068670E+00	.28354459E+02	.22972651E+02	.73938376E+00
9	WSSC AZIMUTH	39 OF	39	.28517217E+00	.32678324E-02	.90330624E-02	.78828340E+00
9	WSSC ELEVATION	39 OF	39	.31561323E+00	.57784200E-02	.10454362E-01	.55262115E+00
10	WHSC RANGE	50 OF	50	.20140139E+00	.61329118E+01	.28270664E+02	.92393143E+00
10	WHSC AZIMUTH	52 OF	52	.77414733E+00	.88710749E-02	.88459095E-02	.77195123E+00
10	WHSC ELEVATION	52 OF	52	-.20656873E+00	-.33389223E-02	.92482631E-02	.57610631E+00
11	HOLC RANGE	40 OF	40	-.38384408E+00	-.11801504E+02	.21722775E+02	.70749086E+00
11	HOLC AZIMUTH	42 OF	42	-.44199736E+00	-.50649167E-02	.86784016E-02	.75733341E+00
11	HOLC ELEVATION	41 OF	41	-.68089848E-01	-.10551669E-02	.11280795E-01	.67828983E+00

Table III. STS-19 residual summary.

OBSERVATION STATISTICS BASED ON FINAL STATE

STATION NO.	OBSERVATION NAME	TYPE	OBSERVATIONS ACCEPTED		AVERAGE WEIGHT. RES.	AVERAGE RESIDUAL	STANDARD STAND. DEV.	WEIGHTED STAND. DEV.
			OF	OF				
12	MILS RANGE		125	OF	-50131582E+00	-52193982E+01	.72086035E+01	.65867343E+00
12	MILS DOPPLER		123	OF	.87184091E-01	.87229637E-01	.45064755E+00	.44789387E+00
12	MILS X-ANGLE		125	OF	-.23923505E+00	-.30710200E-02	.67697822E-02	.47801790E+00
12	MILS Y-ANGLE		124	OF	.73463735E+00	.84206717E-02	.32944094E-02	.28749985E+00
13	MLXS RANGE		140	OF	.24950695E+01	.25346417E+02	.11815347E+02	.11675903E+01
13	MLXS DOPPLER		138	OF	-.18291537E+00	-.18327250E+00	.13066634E+01	.13050566E+01
13	MLXS X-ANGLE		140	OF	.36301871E+00	.42991673E-02	.13341009E-01	.11385545E+01
13	MLXS Y-ANGLE		140	OF	-.10935868E+00	-.12503100E-02	.14884653E-01	.12949236E+01
14	MLMC RANGE		271	OF	-.10653059E+00	-.32428644E+01	.36083461E+02	.11889419E+01
14	MLMC AZIMUTH		286	OF	-.10781922E+01	-.12355172E-01	.15917613E-01	.13890738E+01
14	MLMC ELEVATION		287	OF	-.74983637E+00	-.97181087E-02	.21907696E-01	.15955666E+01
15	MLAC RANGE		242	OF	-.68952869E+00	-.20782588E+02	.31033400E+02	.10265292E+01
15	MLAC AZIMUTH		262	OF	.41133789E+00	.47135850E-02	.69002323E-02	.60215886E+00
15	MLAC ELEVATION		263	OF	-.18065007E+00	-.25881400E-02	.63750564E-02	.50229162E+00
16	PATC RANGE		216	OF	-.65095184E+00	-.19731772E+02	.34729110E+02	.11364363E+01
16	PATC AZIMUTH		235	OF	*.24687371E+00	*.28289643E-02	.44461817E-02	.38800255E+00
16	PATC ELEVATION		236	OF	-.39733337E+00	-.51081403E-02	.73361821E-02	.45980976E+00
17	CNMC RANGE		251	OF	-.78214136E+00	-.23645620E+02	.34010802E+02	.11161693E+01
17	CNMC AZIMUTH		268	OF	-.33659950E+00	-.38571462E-02	.15052692E-01	.13135952E+01
17	CNMC ELEVATION		267	OF	*.16077484E+00	*.13062900E-02	.12351165E-01	.94984471E+00
18	CNVIC RANGE		244	OF	-.77607010E+00	-.23301896E+02	.44997831E+02	.14867218E+01
18	CNVIC AZIMUTH		264	OF	*.20071776E-01	*.23000561E-03	.97690568E-02	.85251103E+00
18	CNVIC ELEVATION		265	OF	-.38752912E+00	-.55008520E-02	.11428139E-01	.83032269E+00
19	PSBV DOPPLER		41	OF	-.66711700E+00	-.20013510E+00	.61635244E-01	.20545081E+00
20	PSBN DOPPLER		41	OF	-.13828737E+01	-.41486210E+00	.12365674E+00	.41218914E+00

TOTAL WEIGHTED FIT STATISTICS--- NOBS = 7823 WGT. MEAN = -.22428048E+00 WGT. STD. DEV. = .12317620E+01

Table III. (concluded).

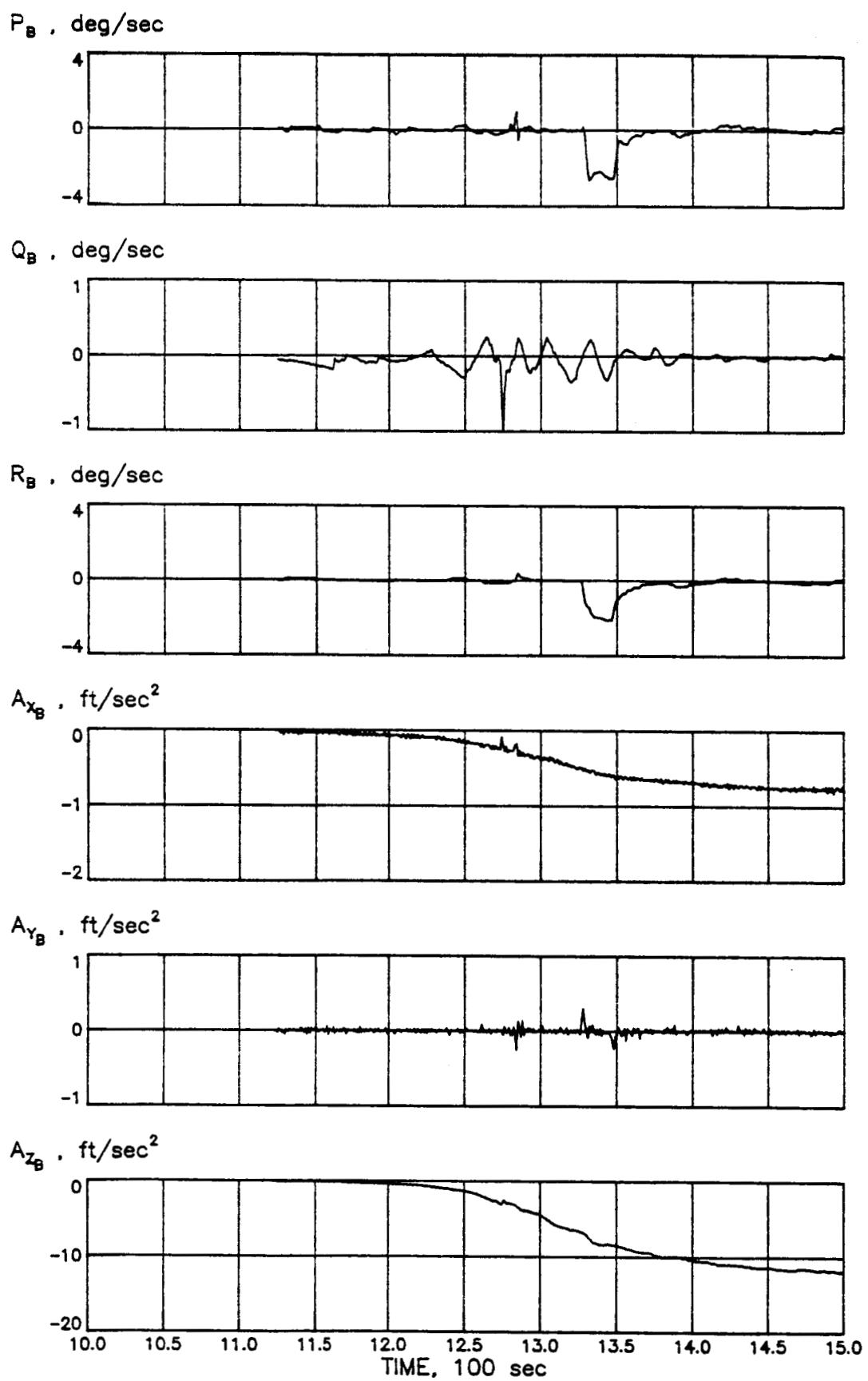


Figure I-1. STS-19 Dynamic data , IMU 2

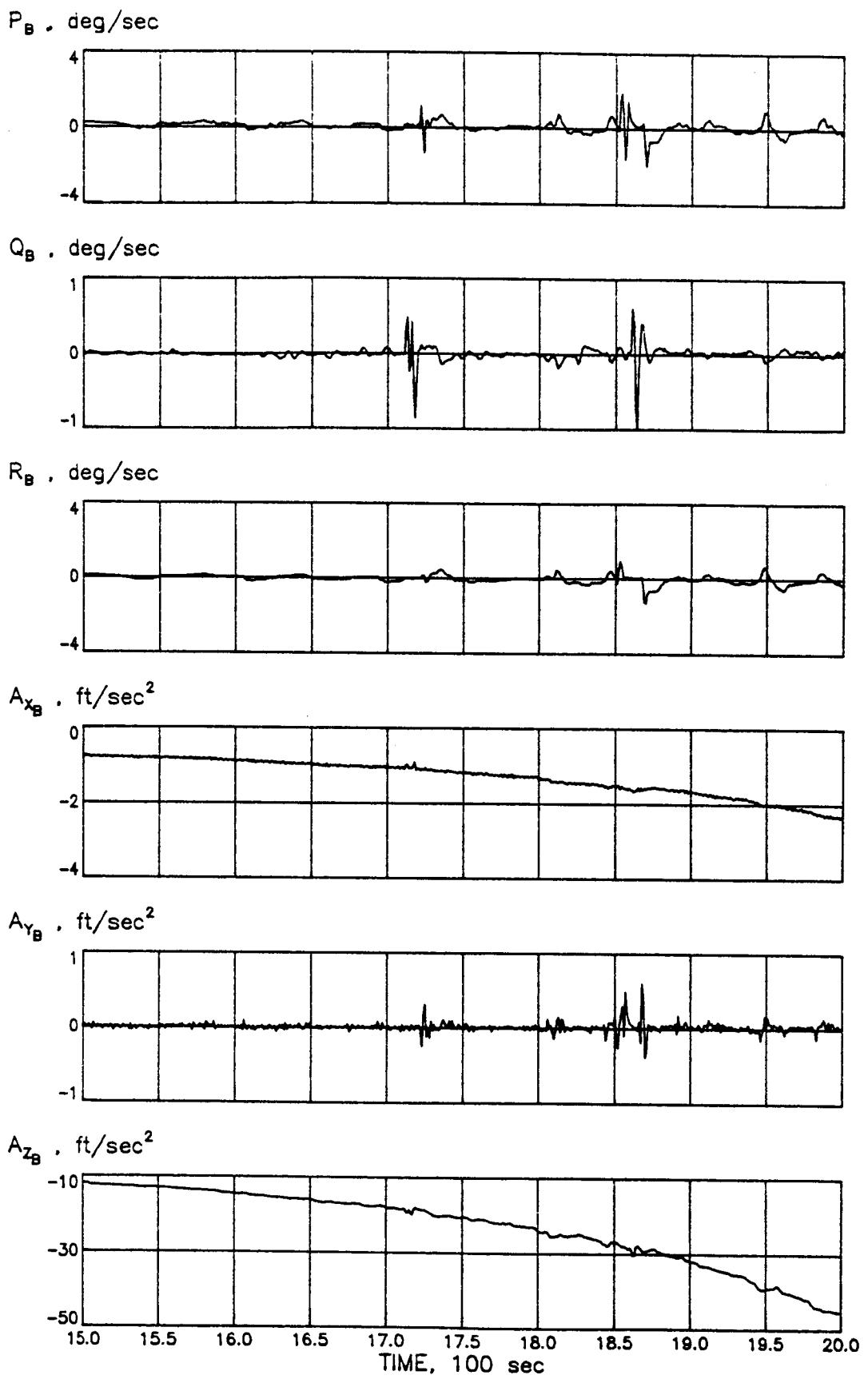


Figure I-1. (continued)

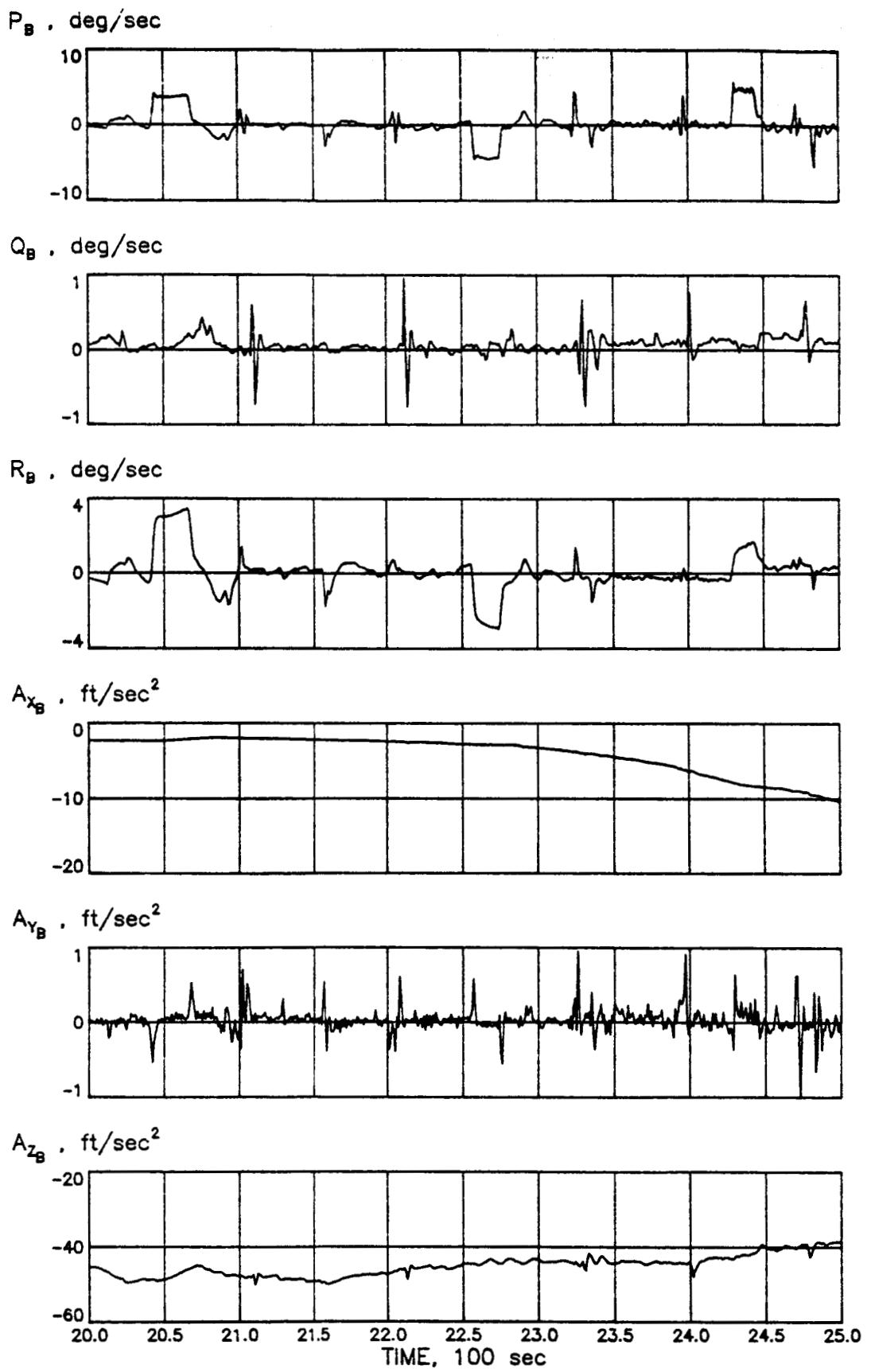


Figure I-1. (continued)

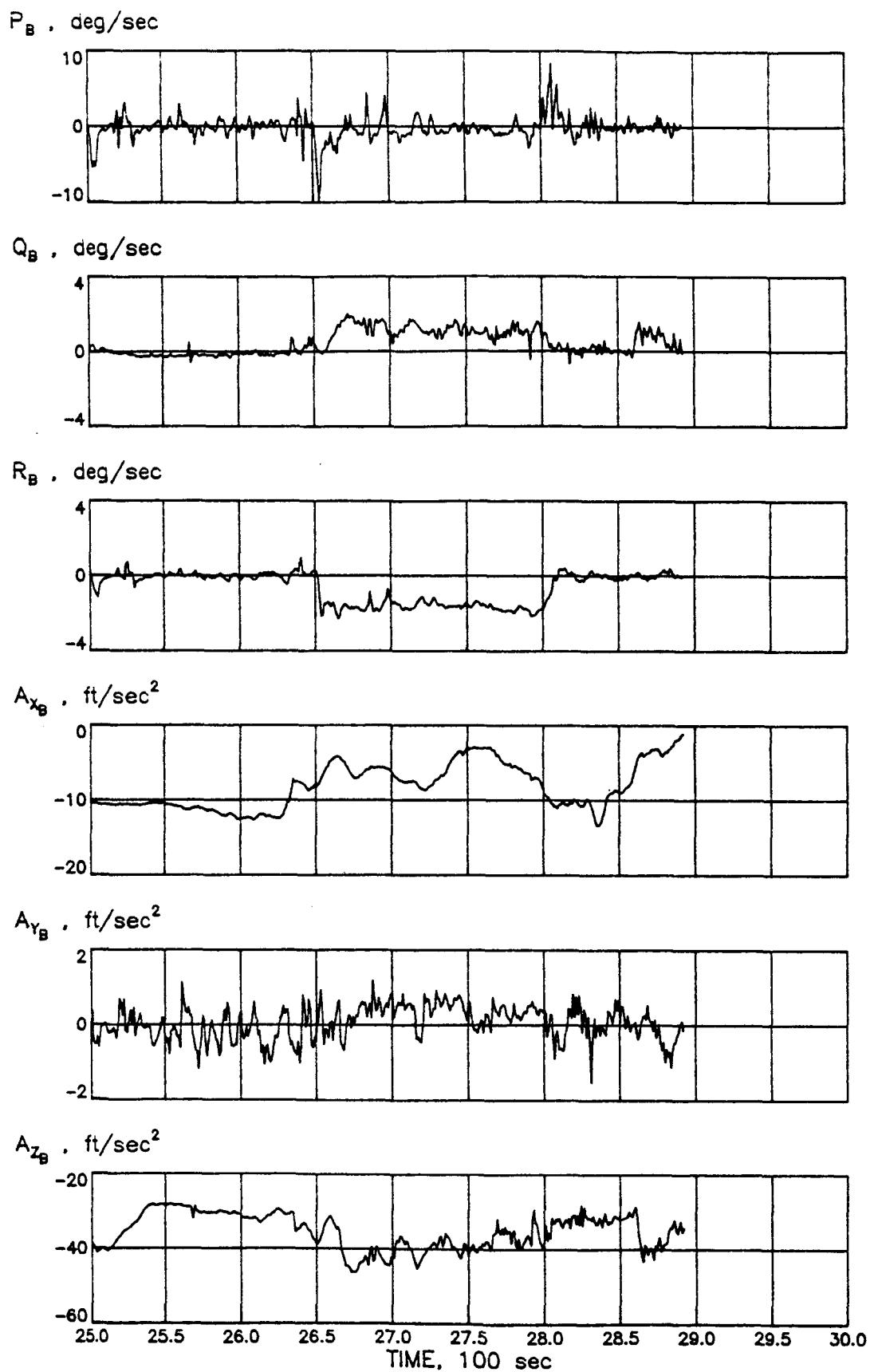


Figure I-1. (concluded)

EPOCH: 11/16/84 11^h11^m40^s (40300^s) GMT

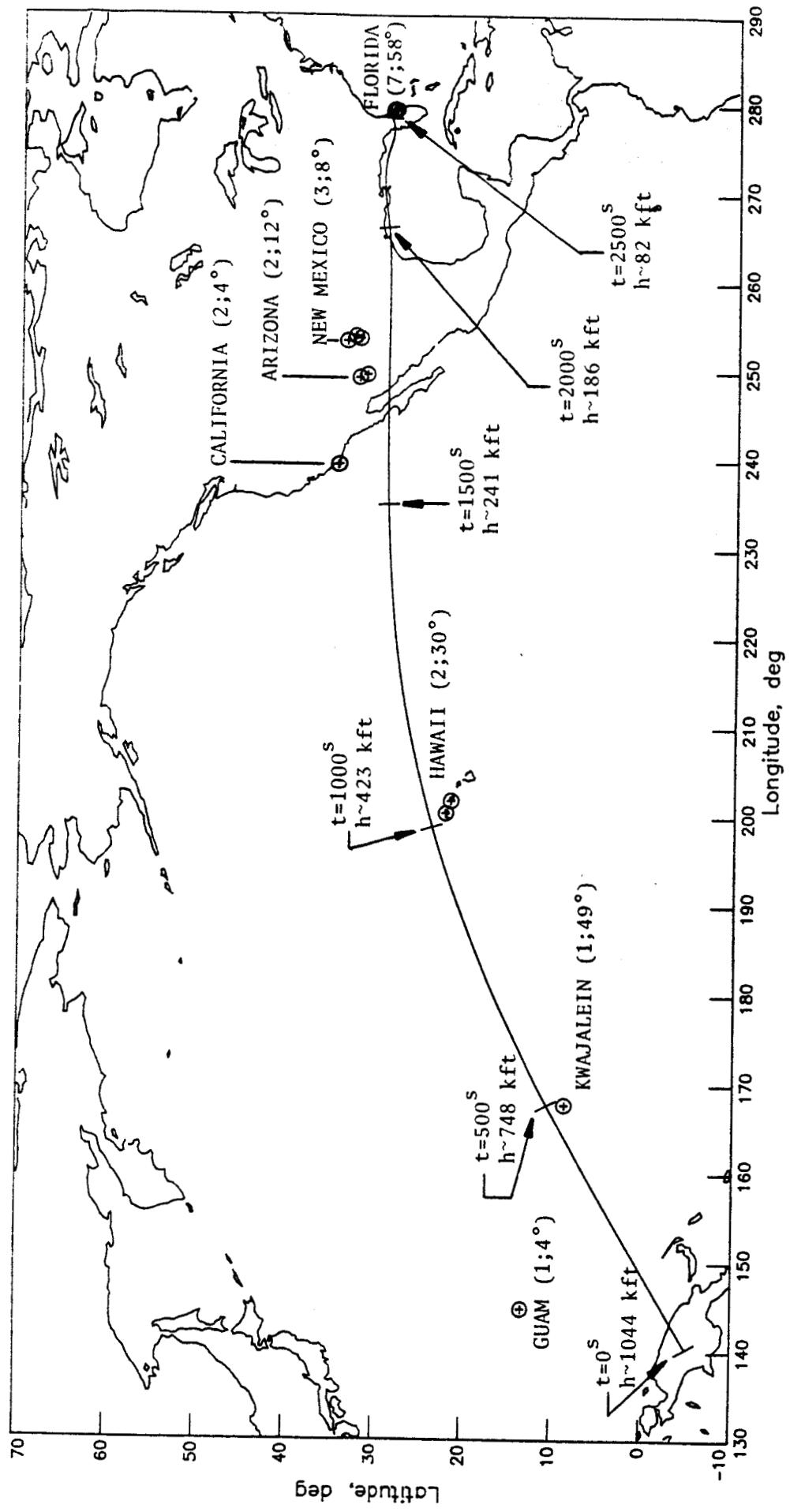


Figure I-2. STS-19 (51A) ground track from epoch to touchdown.

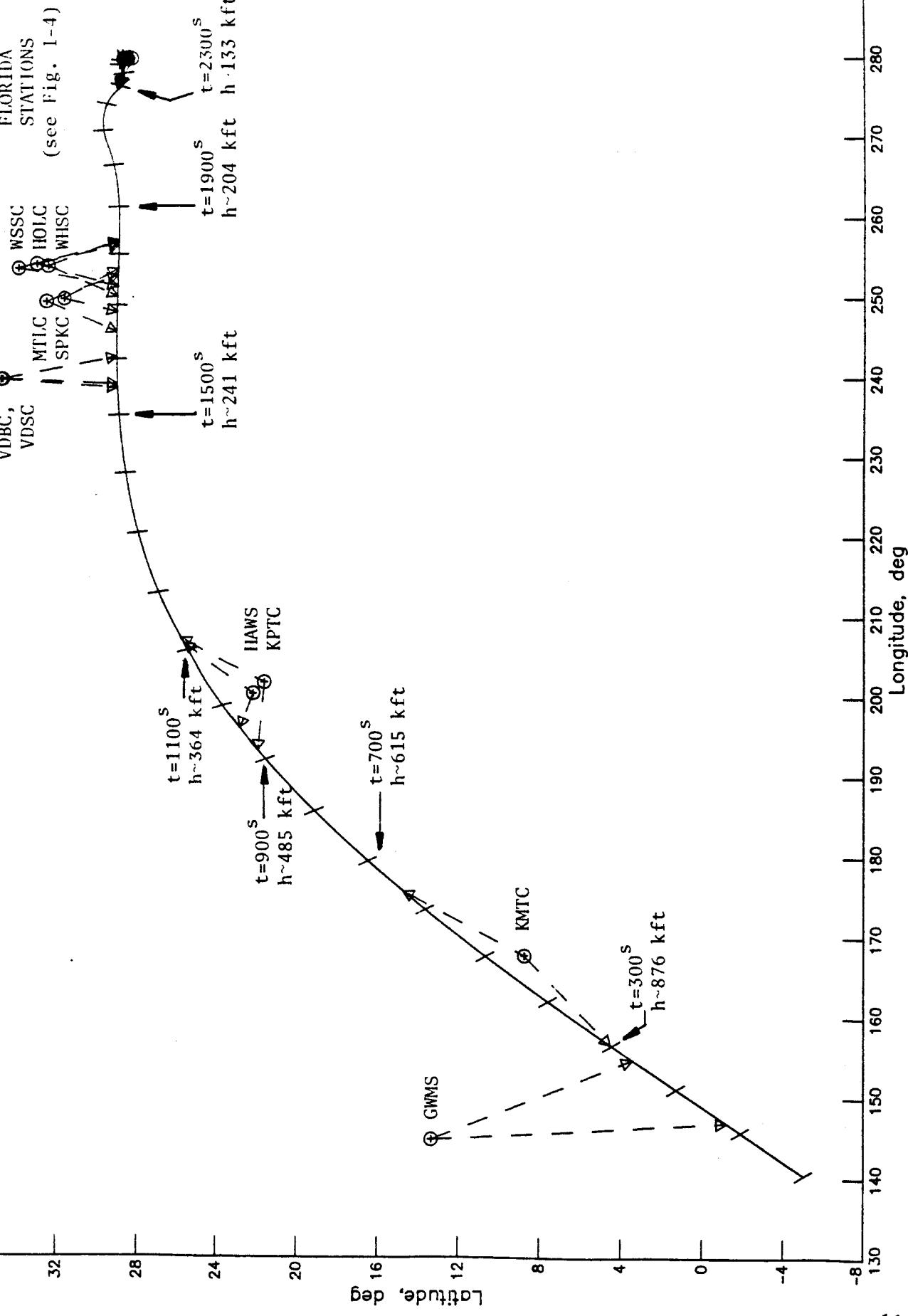


Figure I-3. STS-19 tracking coverage utilized in reconstruction process.

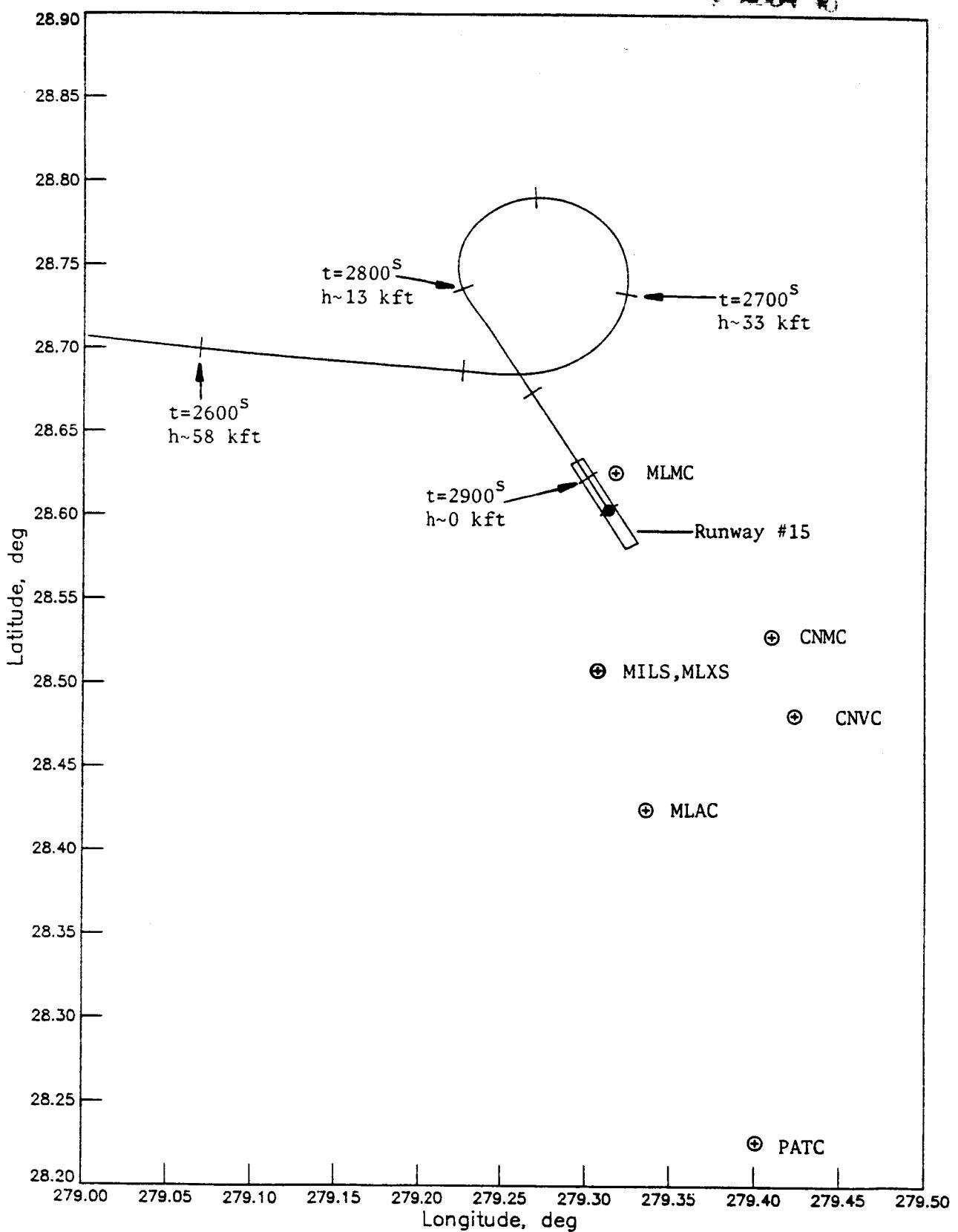
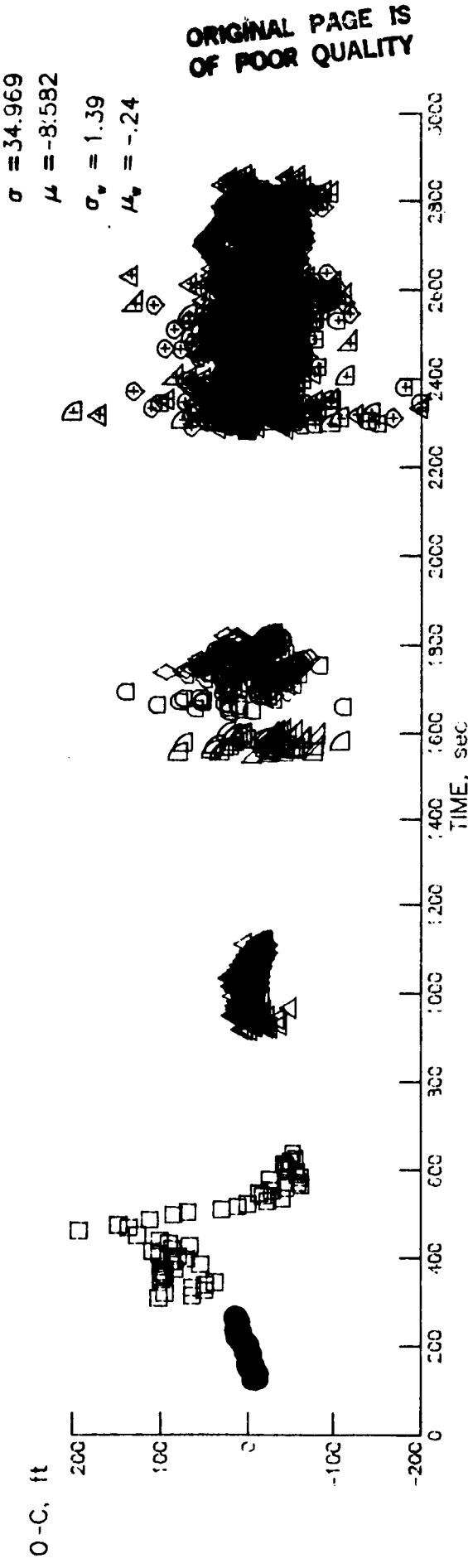
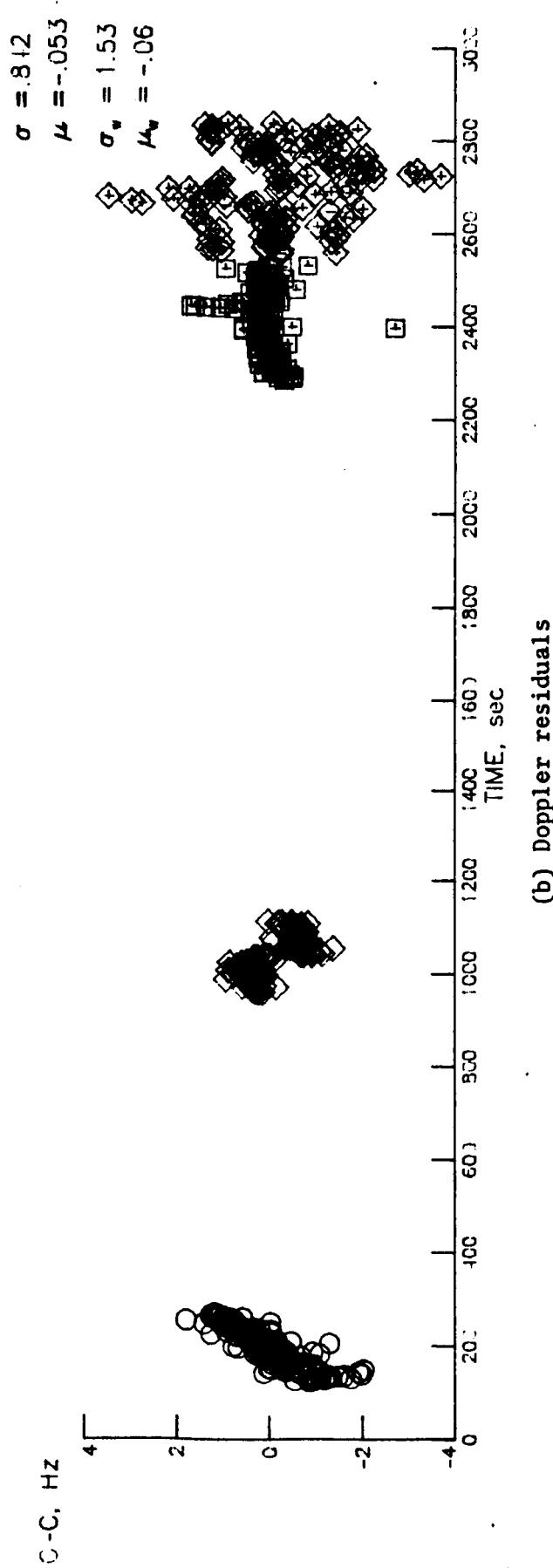


Figure I-4. STS-19 final approach and landing.



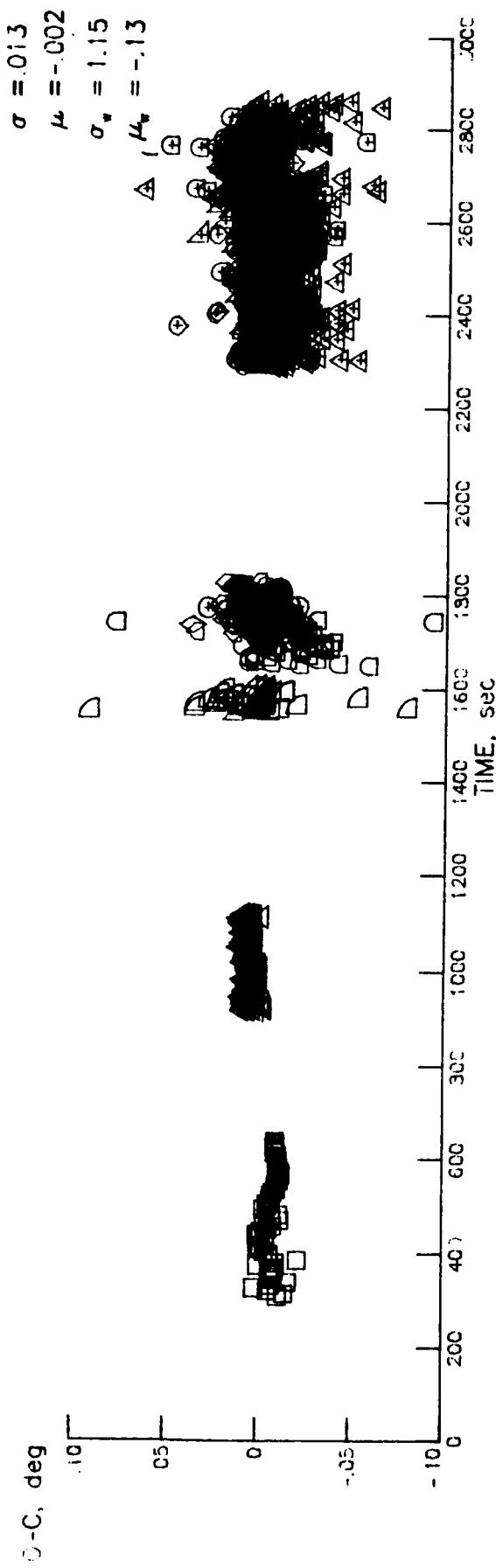
(a) Range residuals



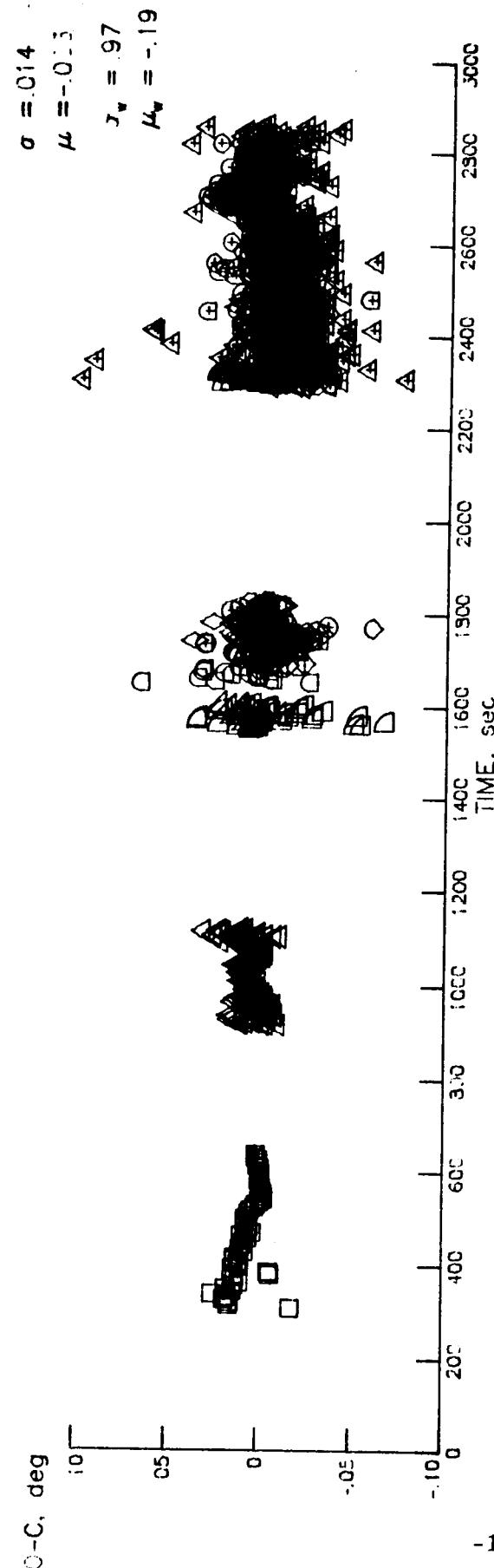
(b) Doppler residuals

Figure I-5. STS-19 composite range and Doppler residuals.

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(a) Azimuth residuals



(b) Elevation residuals

Figure I-6. STS-19 composite azimuth and elevation residuals.

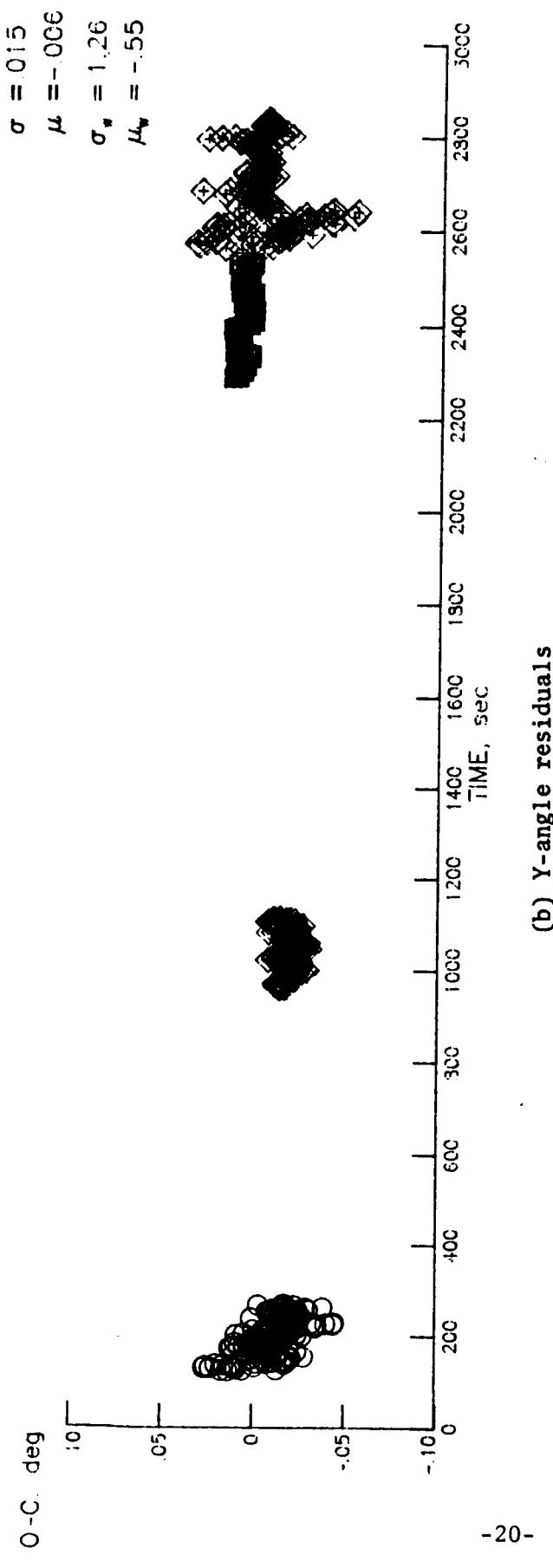
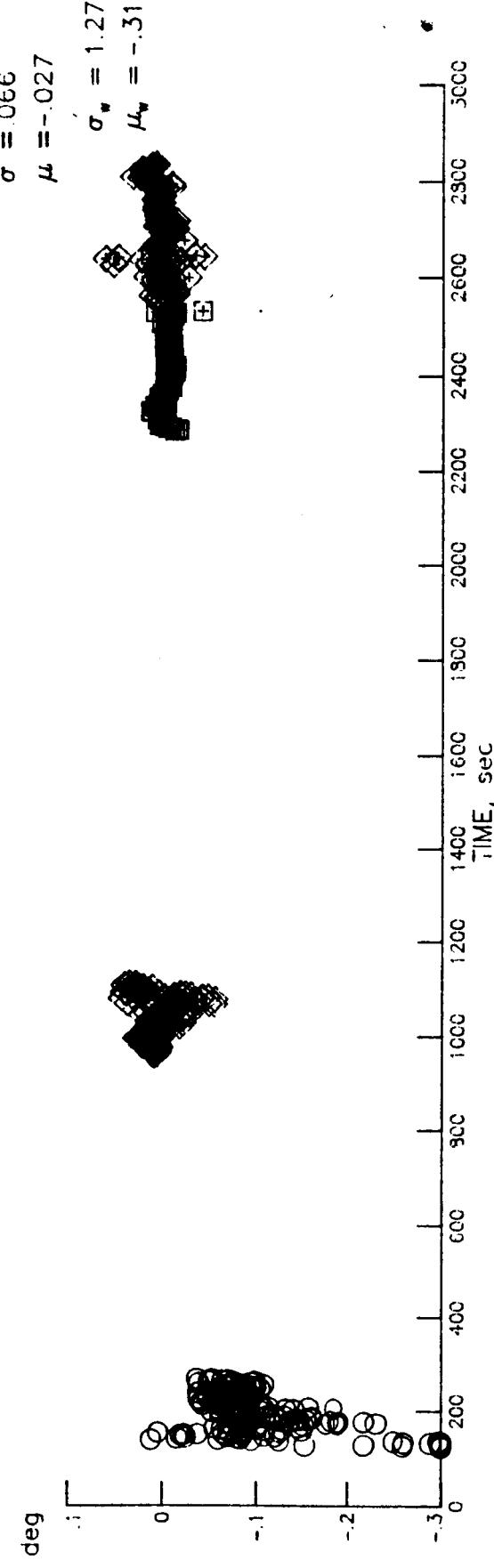


Figure I-7. STS-19 composite X-and Y-angle residuals.

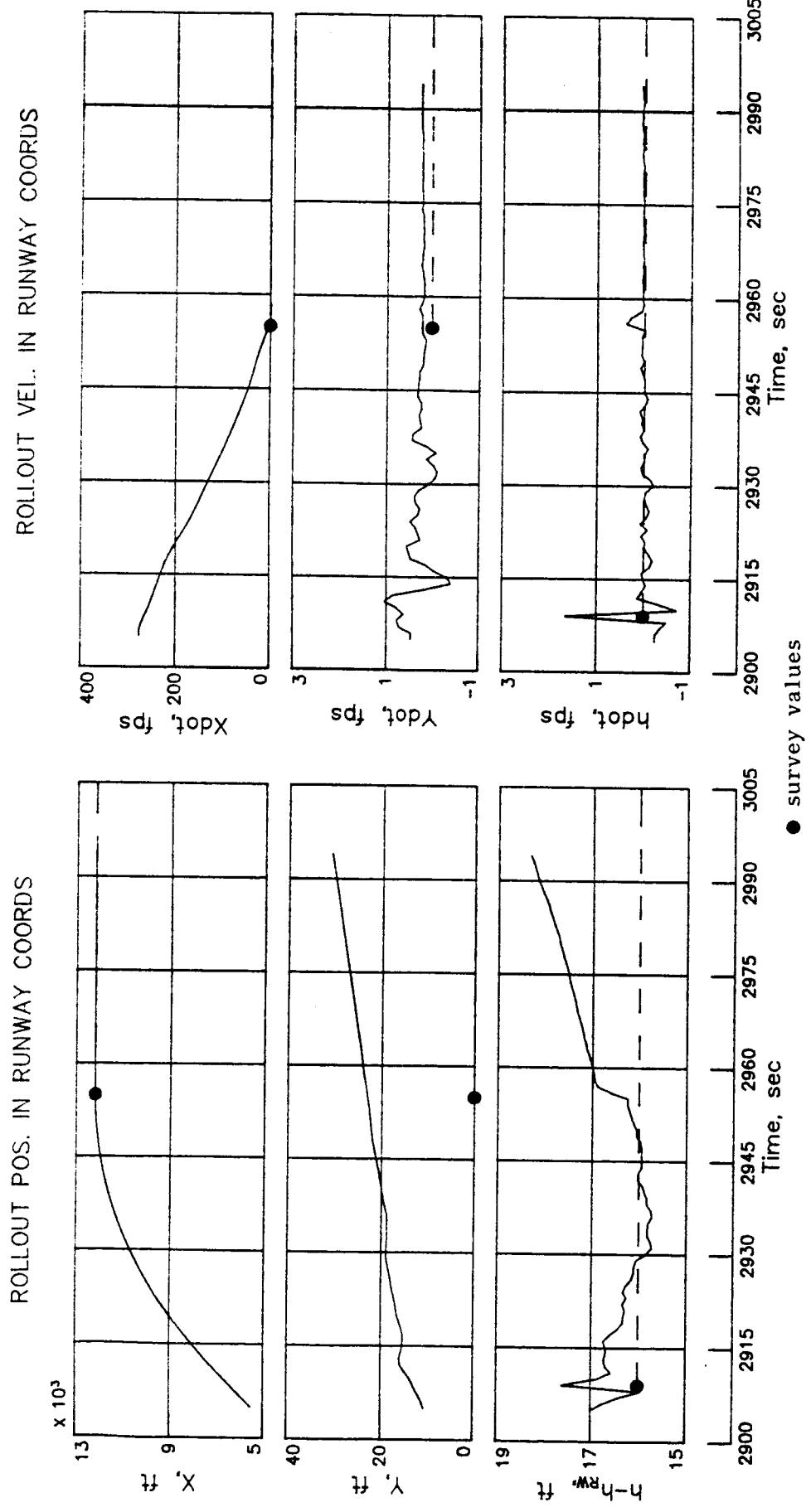


Figure I-8. Rollout position and velocity plots for STS-19.

II. Extended BET Development

The atmosphere selected for STS-19 (51-A) was the LAIRS file developed by J. M. Price, LaRC AB/SSD, designated as ST19MET/UN=712662N. Selection of this atmosphere is vindicated in the first few figures presented in the section. Comparisons are presented based on these data and the usual four (4) alternative sources, namely: the NOAA "totem-pole" data derived from the JSC BET, the MSFC Global Reference Atmosphere Model (GRAM), the USAF 1978 Reference Atmosphere (AF78), and Shuttle derived parameters. Symbols utilized on the plots are shown below:

O	LAIRS
●	NOAA
△	GRAM
□	AF78

Density, temperature, and pressure comparisons are presented as Figures II-1 through II-3, respectively. Two altitude regions are shown on each plot as a continuation with 50 kft overlap. The upper altitude plots cover the region between 350 kft and 150 kft. The lowermost 200 kft is covered in the continuation frame. Figure II-1 shows that the two measurement density sources are in better agreement with the Shuttle derived data than either of the models. The models tend to depart toward a more dense estimate above

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100 kft whereas the two remote sources are in reasonable agreement. Of course, neither source can be expected to reflect the density structure visible in the accelerometry. The major discrepancies between the remote sources to note are in the narrow interval between altitudes of 230 and 260 kft and, surprisingly, a fairly broad region centered around an altitude of 150 kft. Use of the NOAA data would indicate an underpredicted aerodynamic data base error at h[~]250 kft which is not typical of the previous flight results. Therein, LAIRS would appear to be more appropriate. The difference at the lower altitude reflects an implied data base overprediction difference dependent upon which density source is selected, e.g., an additional six (6) percent overprediction would be suggested by the LAIRS data. Throughout this interval, the LAIRS data are in better agreement with the two models. Thus, on the basis of atmospheric density alone, the LAIRS file was selected. This is also true for pressure as can be seen in Figure II-3 but not substantiated in the temperature plot of Figure II-2. It is noted that the LAIRS density data do tend to depart quite drastically above 350 kft, actually exceeding 50 percent of Standard above 360 kft. As a consequence, the AEROBET and GTFILEs were only generated below this altitude. This is of no consequence since the upper altitude is still substantially above that corresponding to meaningful signal in the IMUs.

Wind comparisons are shown as **Figures II-4** and **II-5** for the two remote sources and the **GRAM** data. In general, the major East-West component is in good agreement. Above 50 kft one has little recourse but to review these data for reasonableness. In the subsonic regime evaluations were made based on the *in situ* side probe measurements. These comparisons are summarized as **Figures II-6** and **II-7**. The first of these two figures shows the **LAIRS** and **NOAA** winds superimposed on charts containing both batch and deterministic estimates of the winds. The notation, **FLAIR19**, is made since the LaRC file had to be modified slightly at the lower end. The modification involved merging the **NOAA** atmosphere over the bottom 2 kft wherein the **LAIRS** data were incomplete. **Figure II-7** shows residual differences between the *in situ* air data parameters and those computed based on the **FLAIR19** data. The results shown on each of these last two figures are well within the accuracy of quantifying the subsonic winds. Thus, the **LAIRS** data, modified as suggested, were adopted.

The remaining four figures in this section simply show the final atmospheric parameters for **STS-19**. The final temperature profile is plotted in **Figure II-8** over the lowermost 360 kft. Similarly, final density and pressure profiles are shown in **Figure II-9** and **II-10**, respectfully. Finally, southward and westward wind profiles are shown in **Figure II-11**.

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h , kft

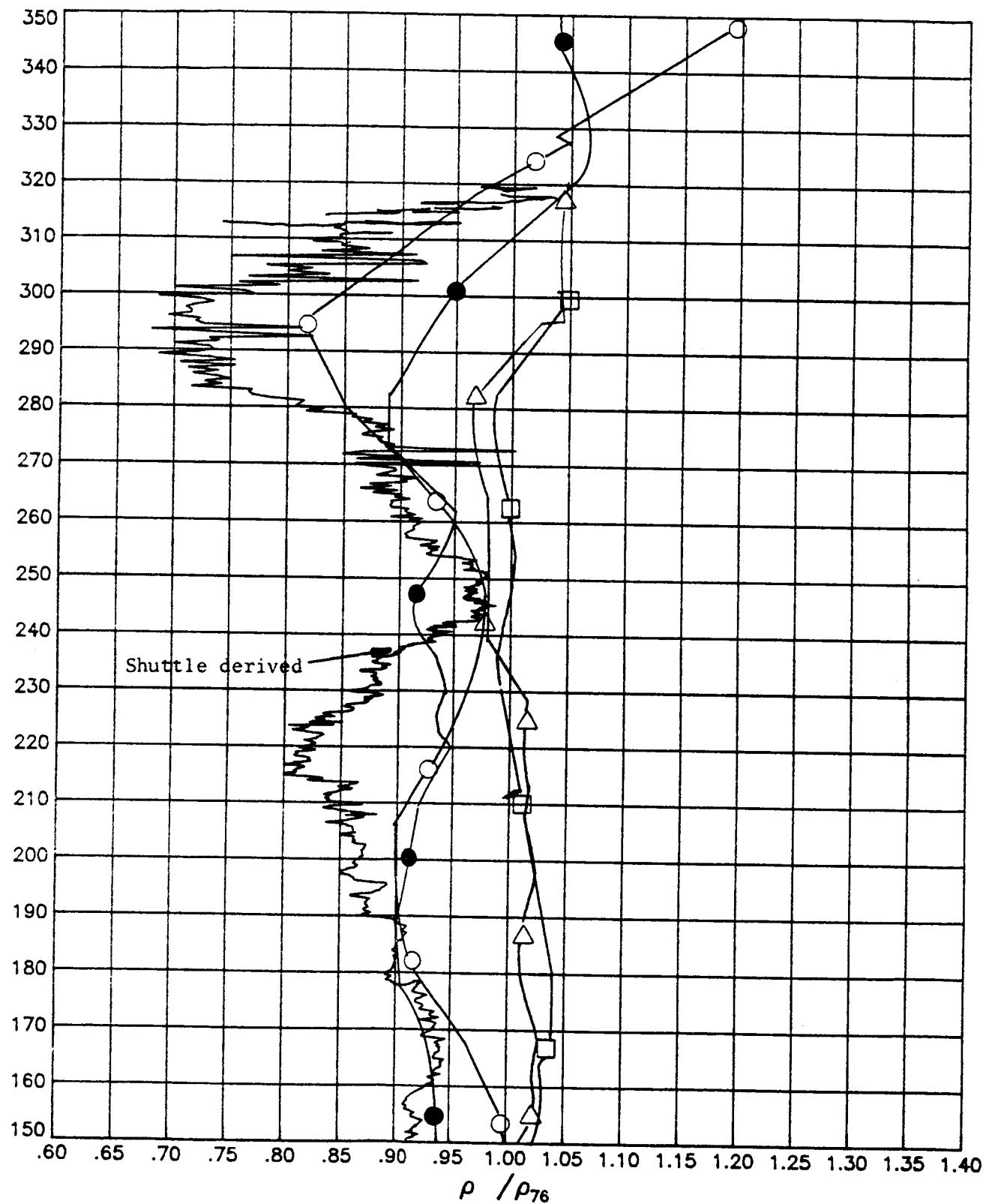


Fig. II-1 STS-19 (51-A) density comparisons

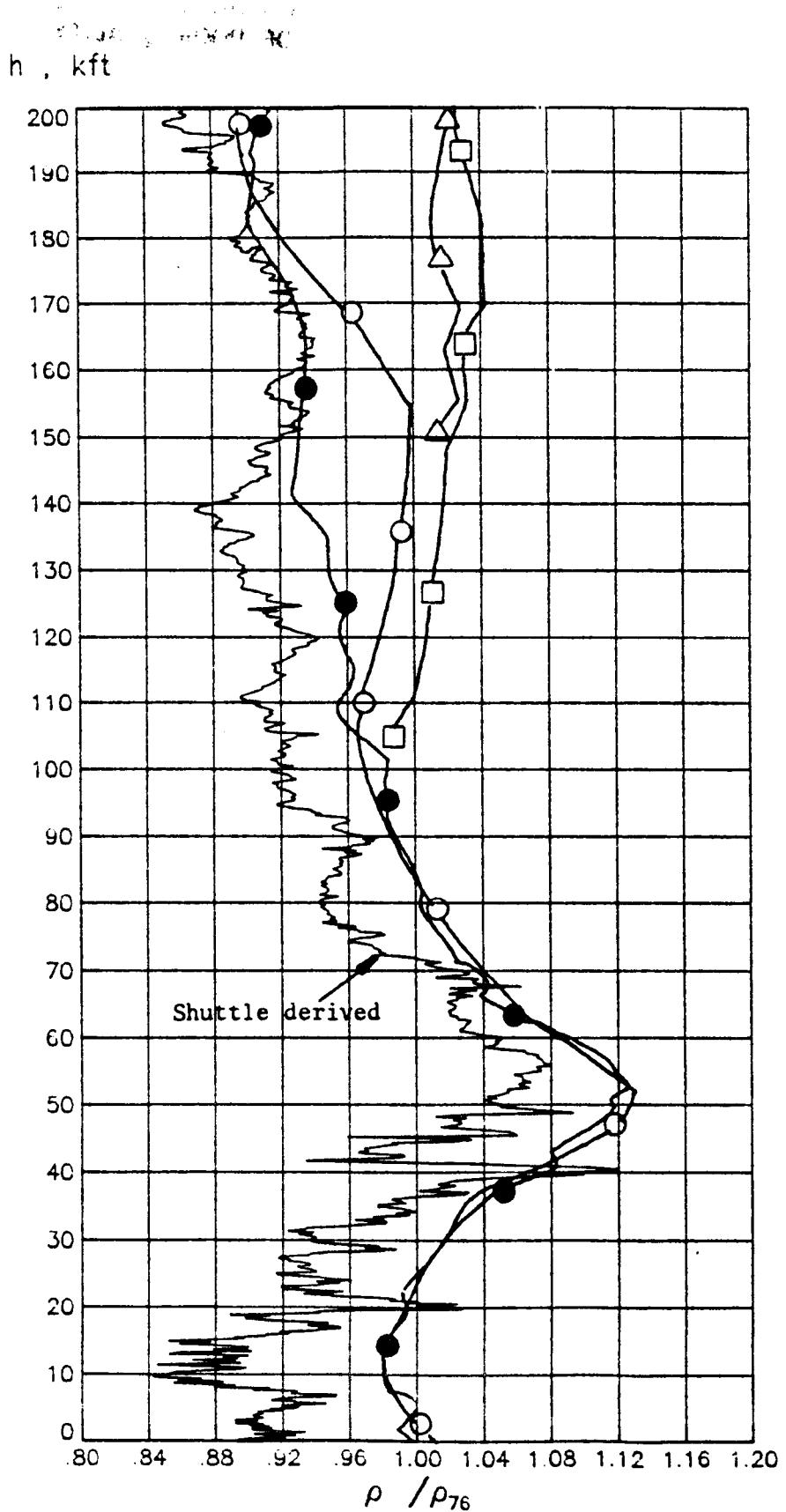


Fig. II-1 (concluded)

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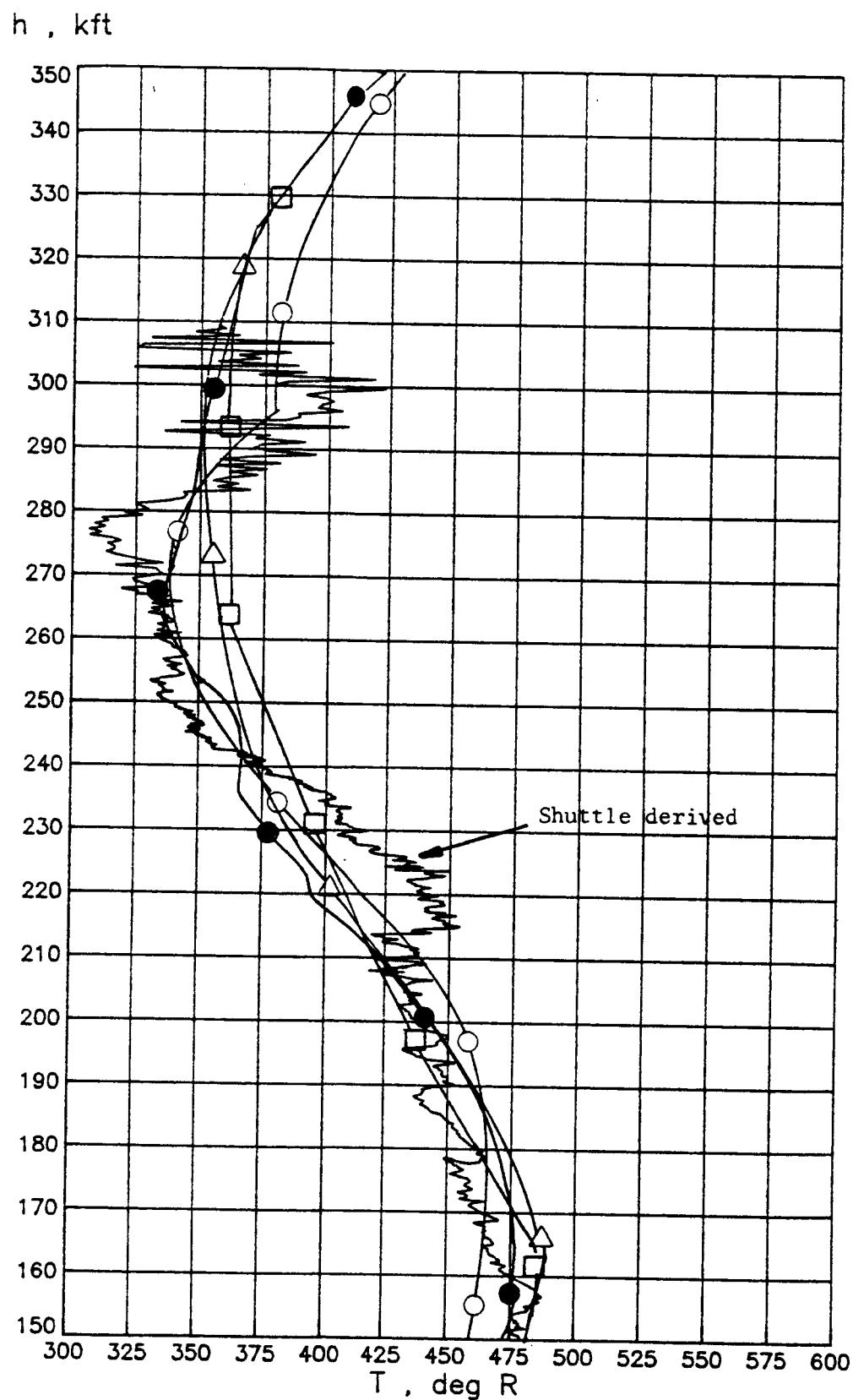


Fig. II-2 STS-19 (51-A) temperature comparisons

h , kft

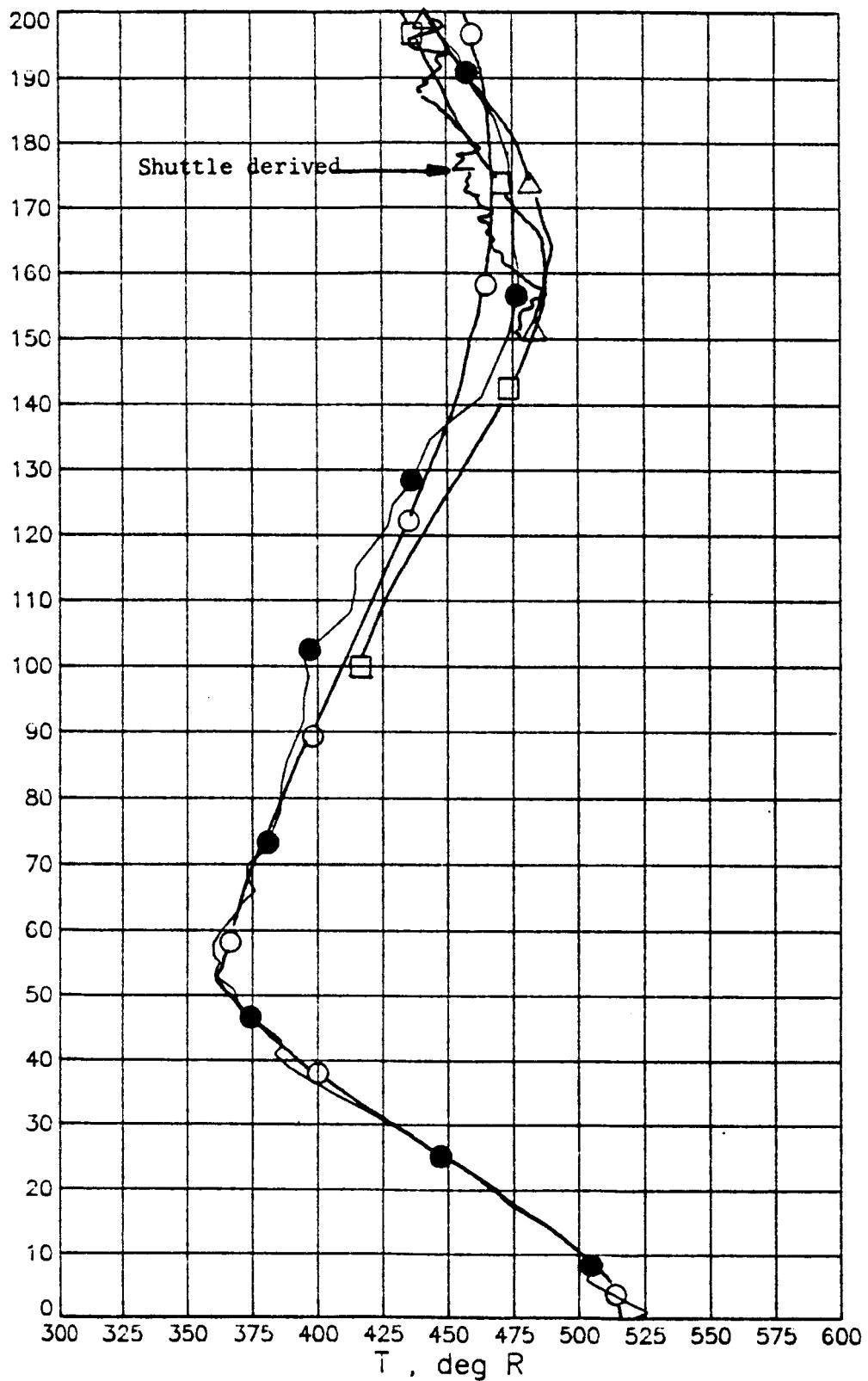


Fig. II-2 (concluded)

h , kft

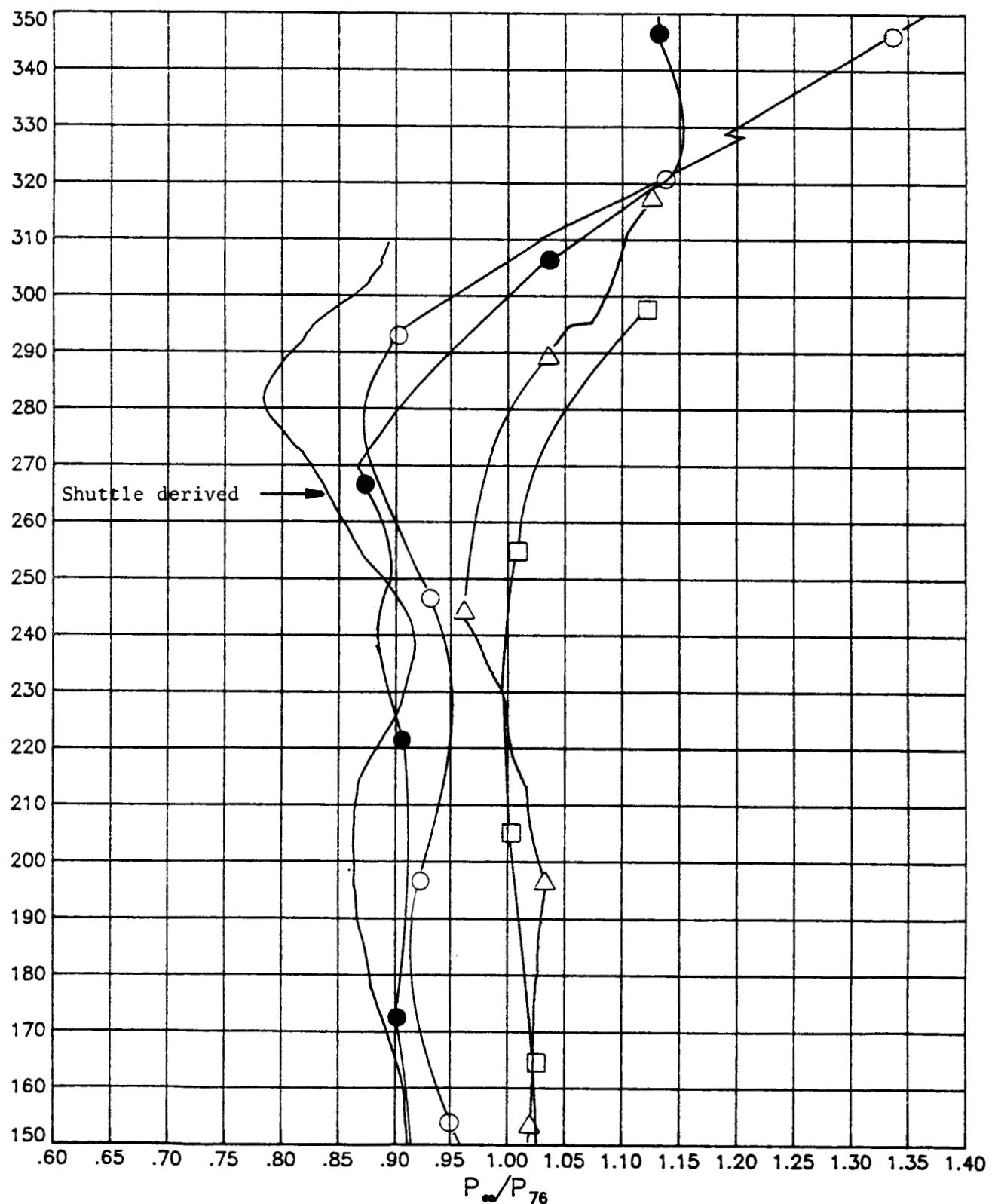


Fig. II-3 STS-19 (51-A) pressure comparisons

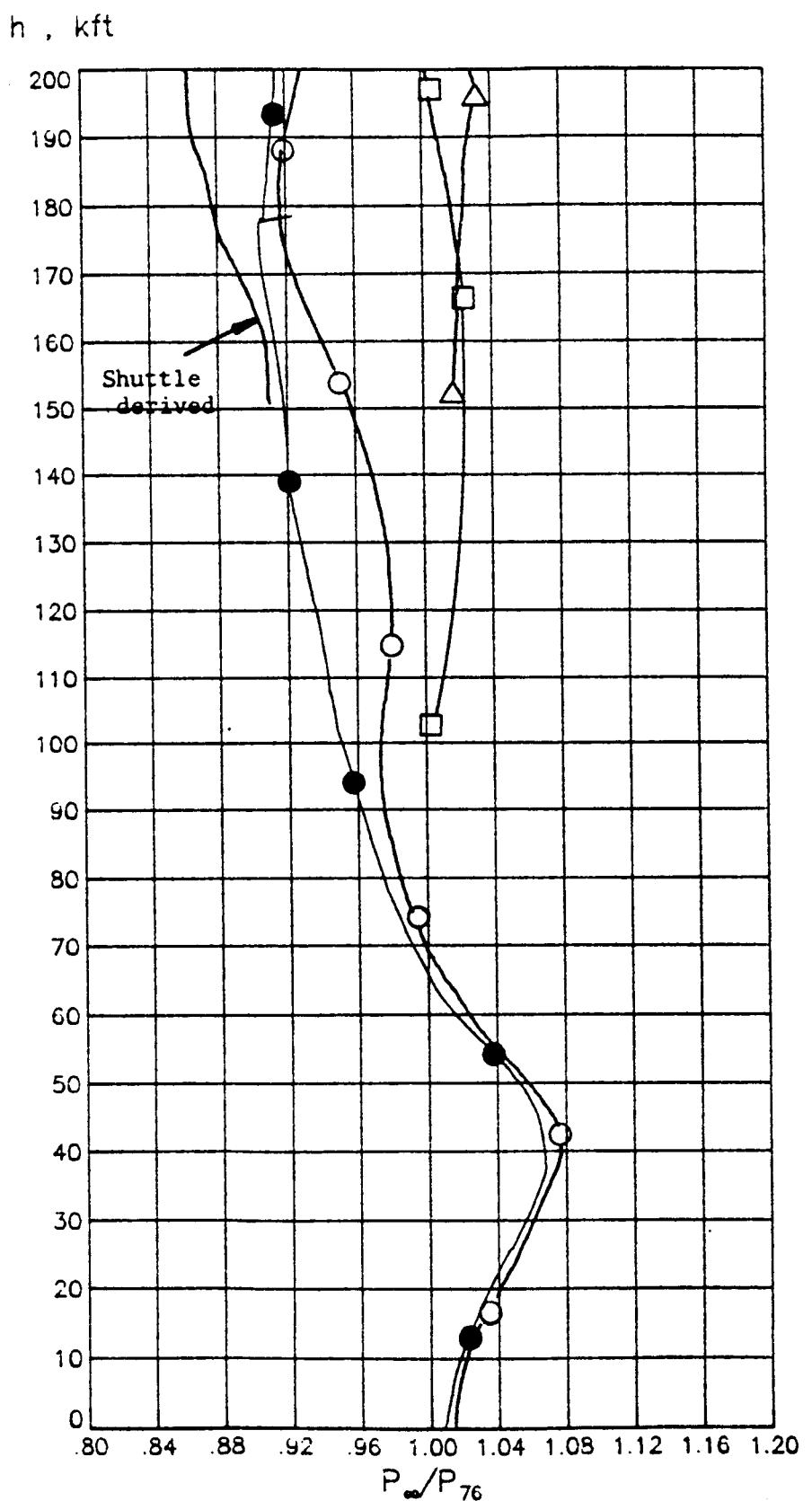


Fig. II-3 (concluded)

h , kft

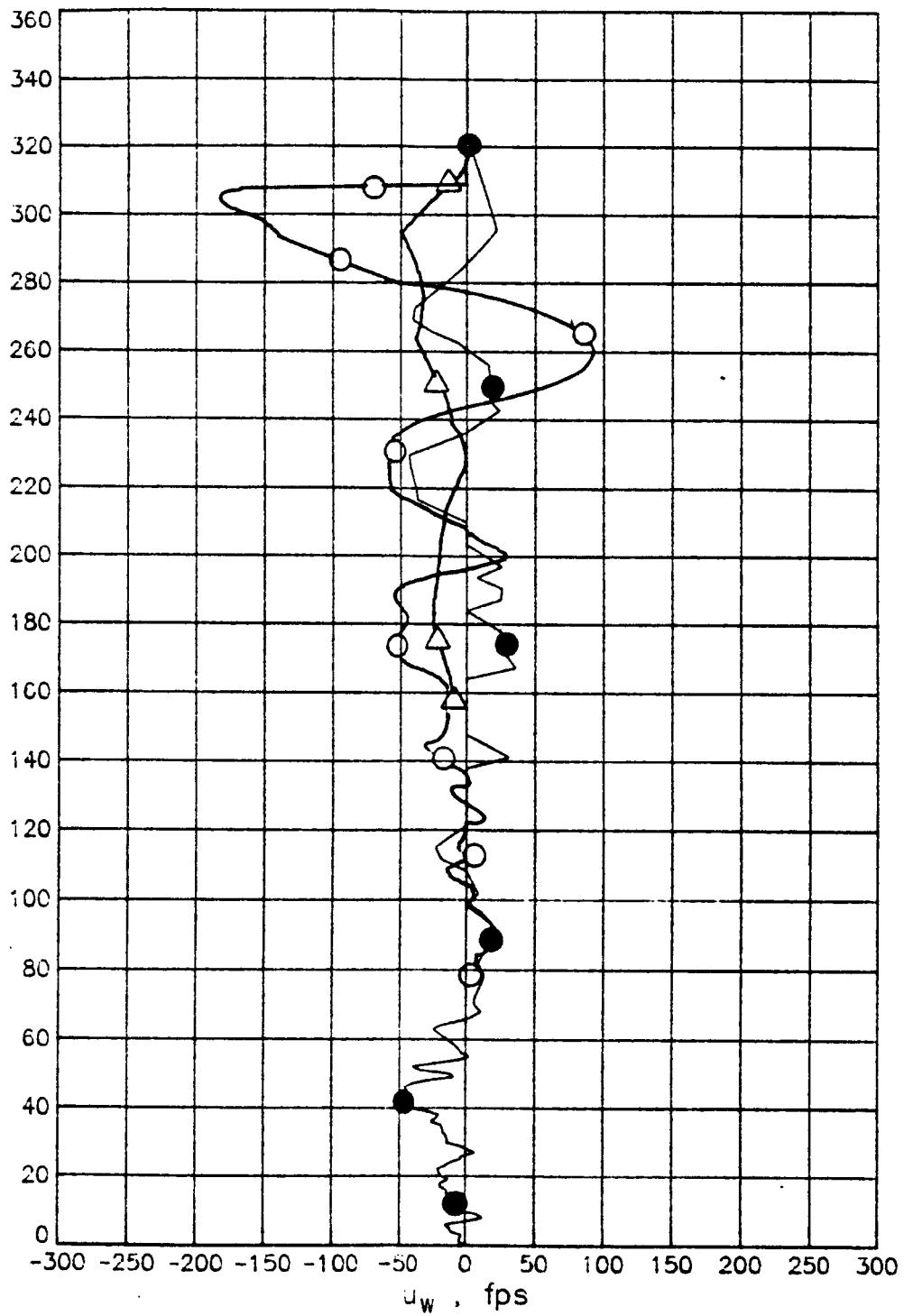


Figure II-4 North-South wind comparisons for STS-19

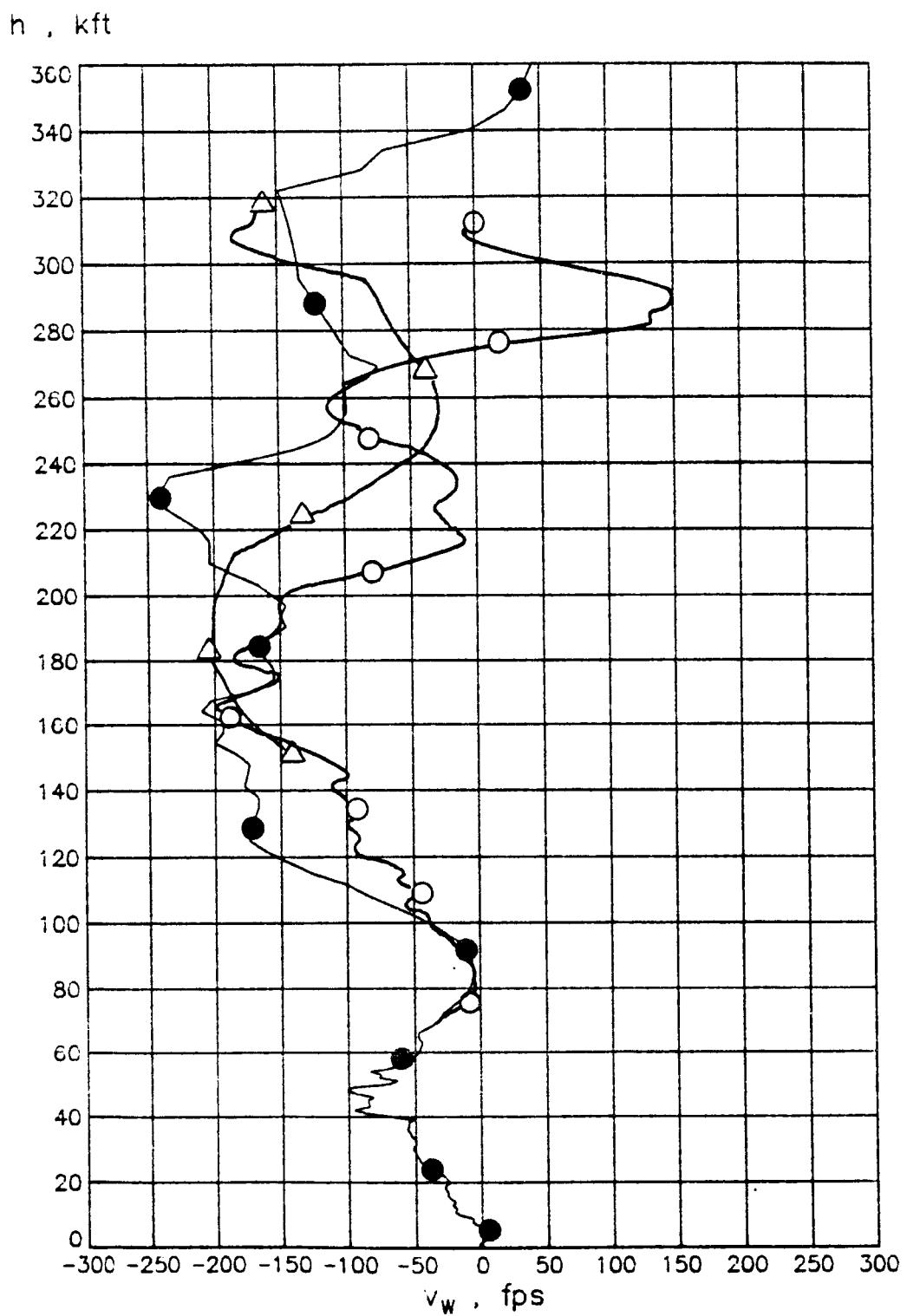


Figure II-5 East-West wind comparisons for STS-19

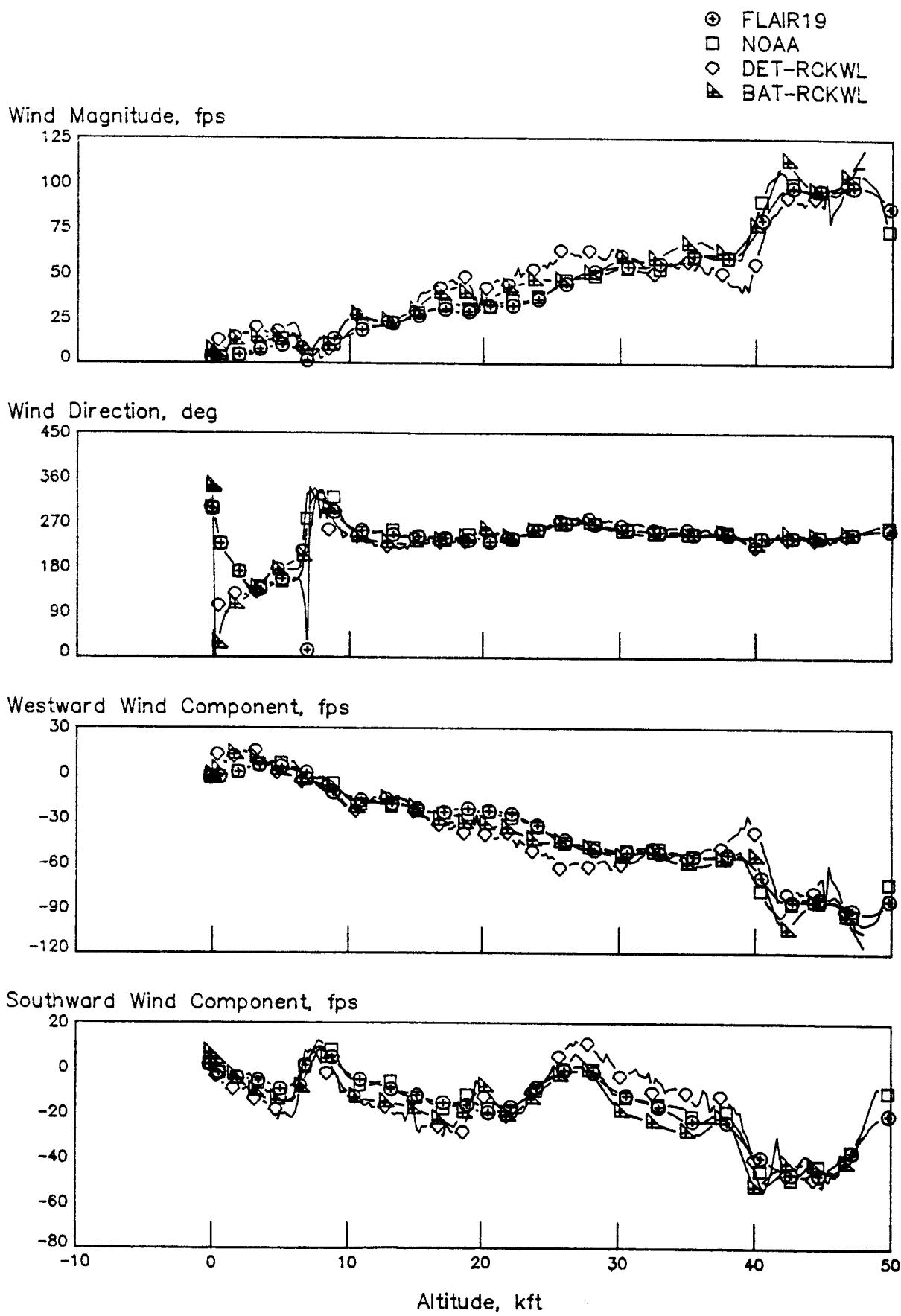


Fig. II-6. STS-19 Measured and Derived Winds

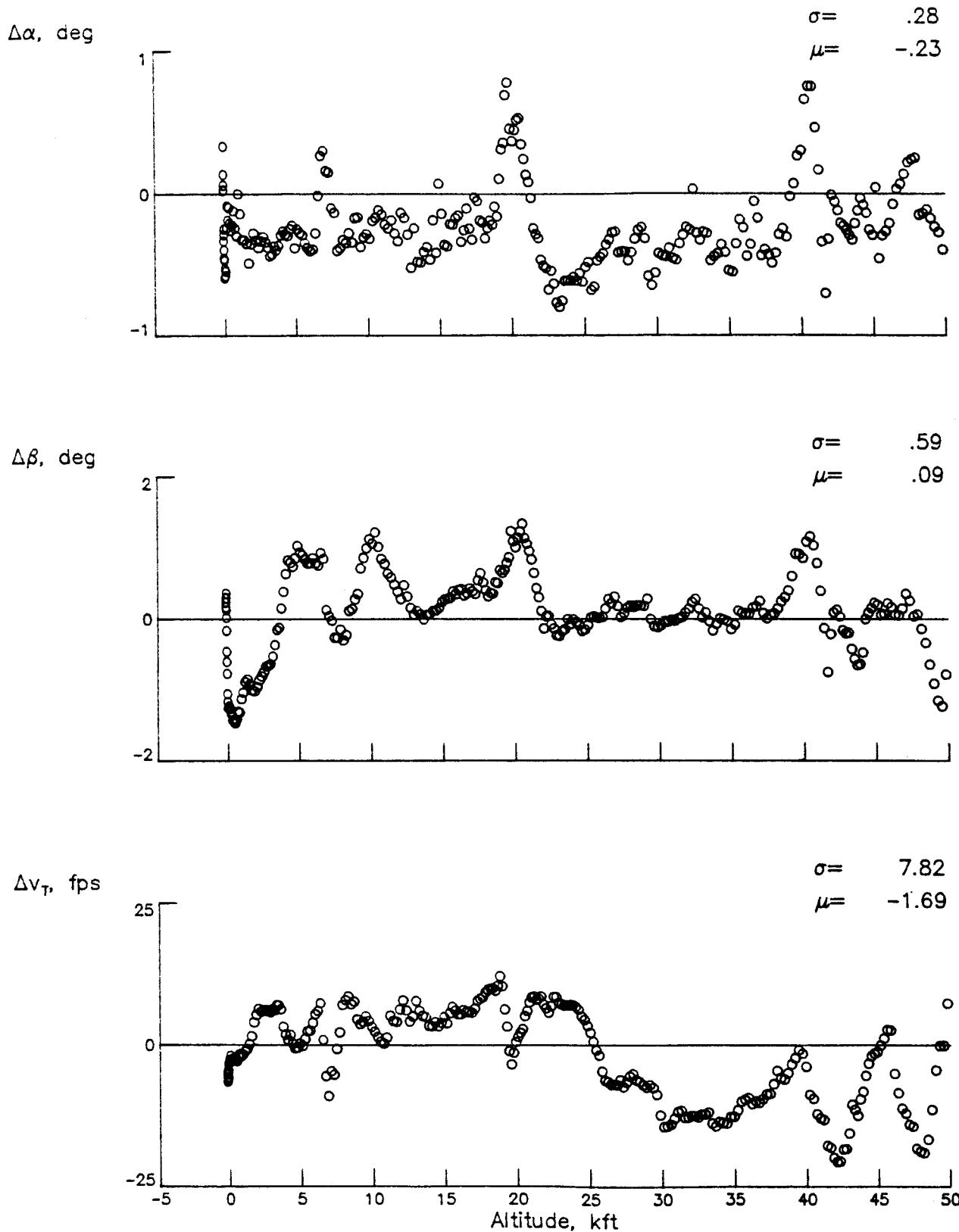


Fig. II-7. STS-19 ADP Differences, ST19ADS-ST19BET

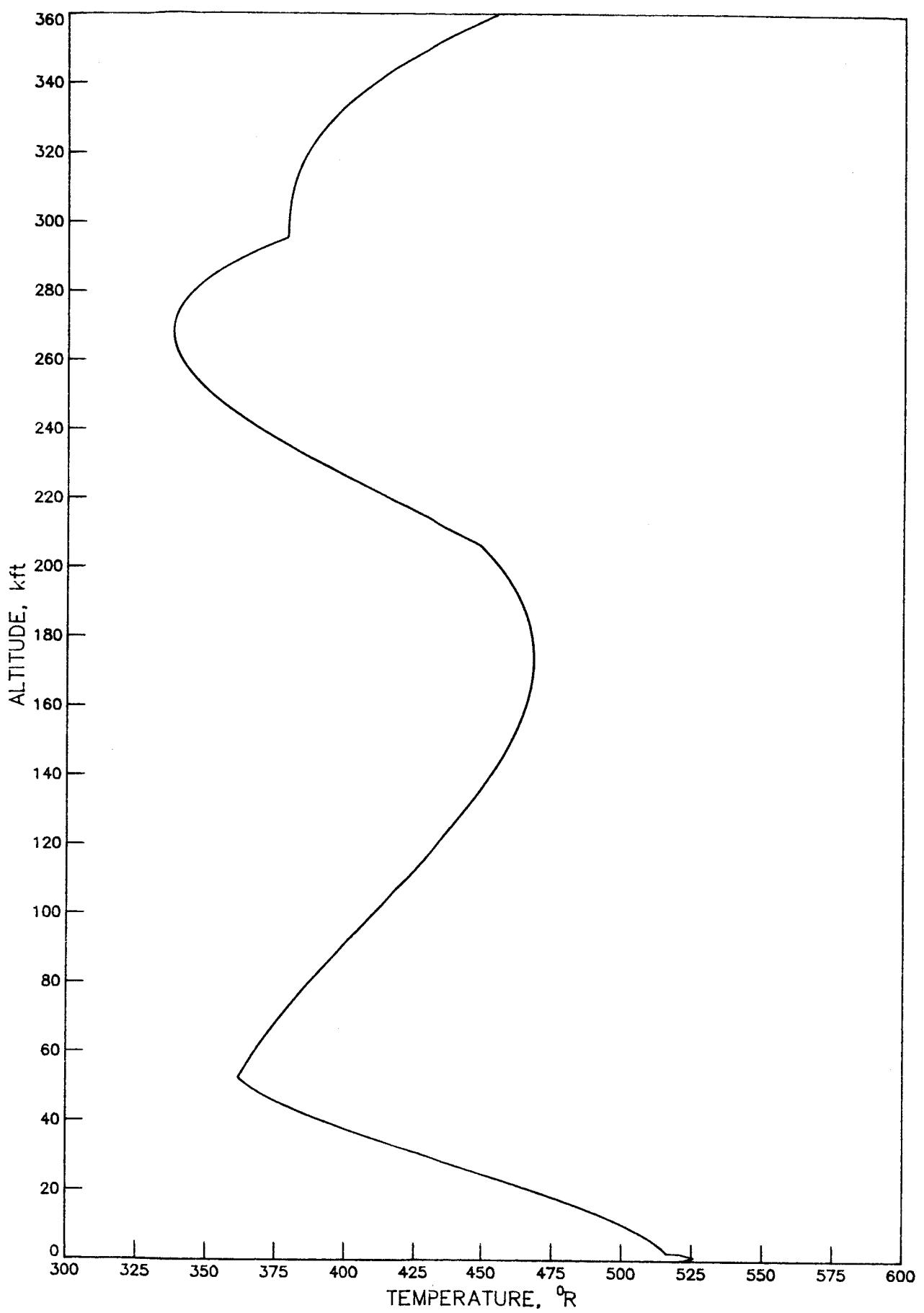


Figure II-8 Final temperature profile for STS-19 (51-A)

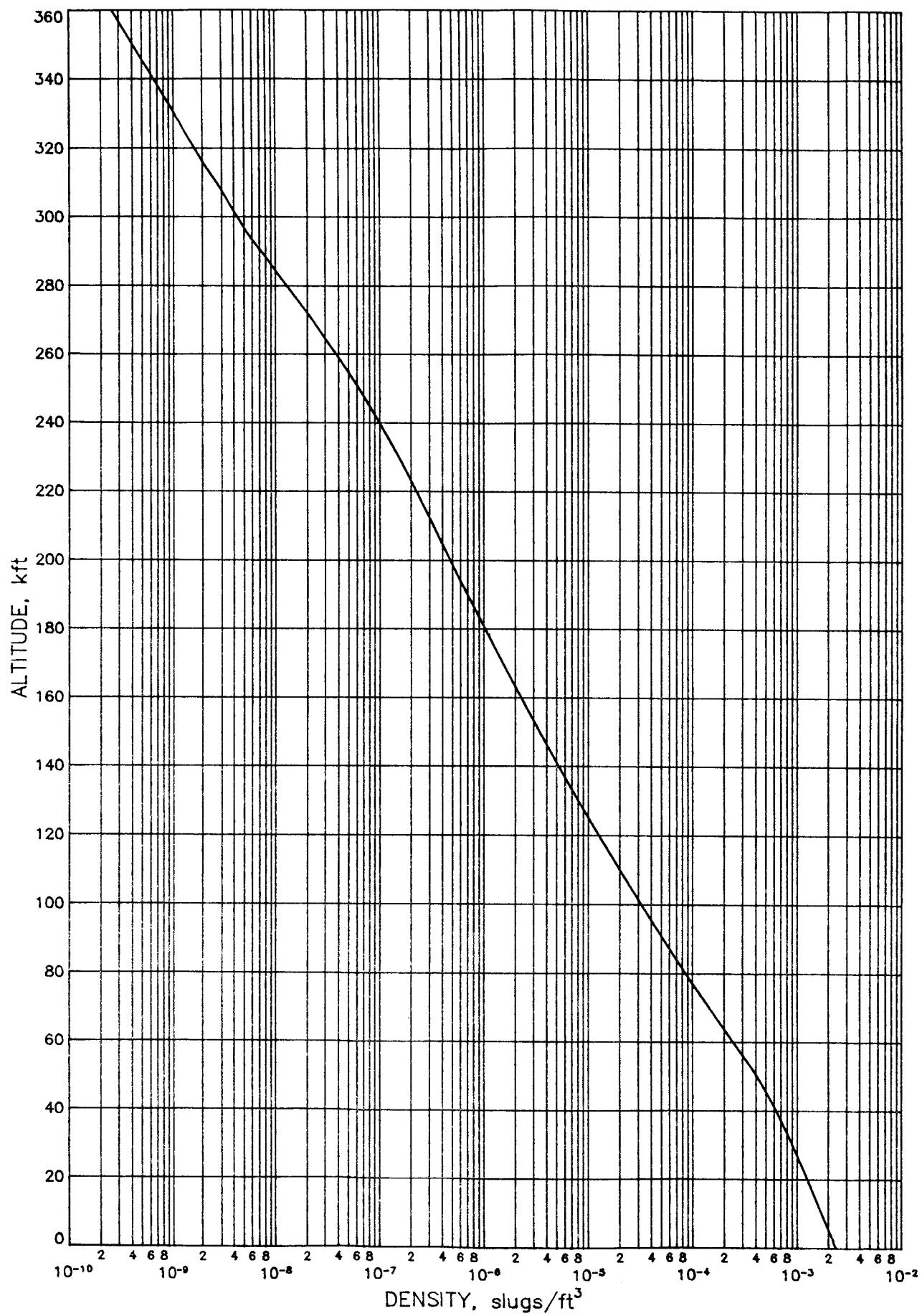


Figure II-9 Final density profile for STS-19 (51-A)

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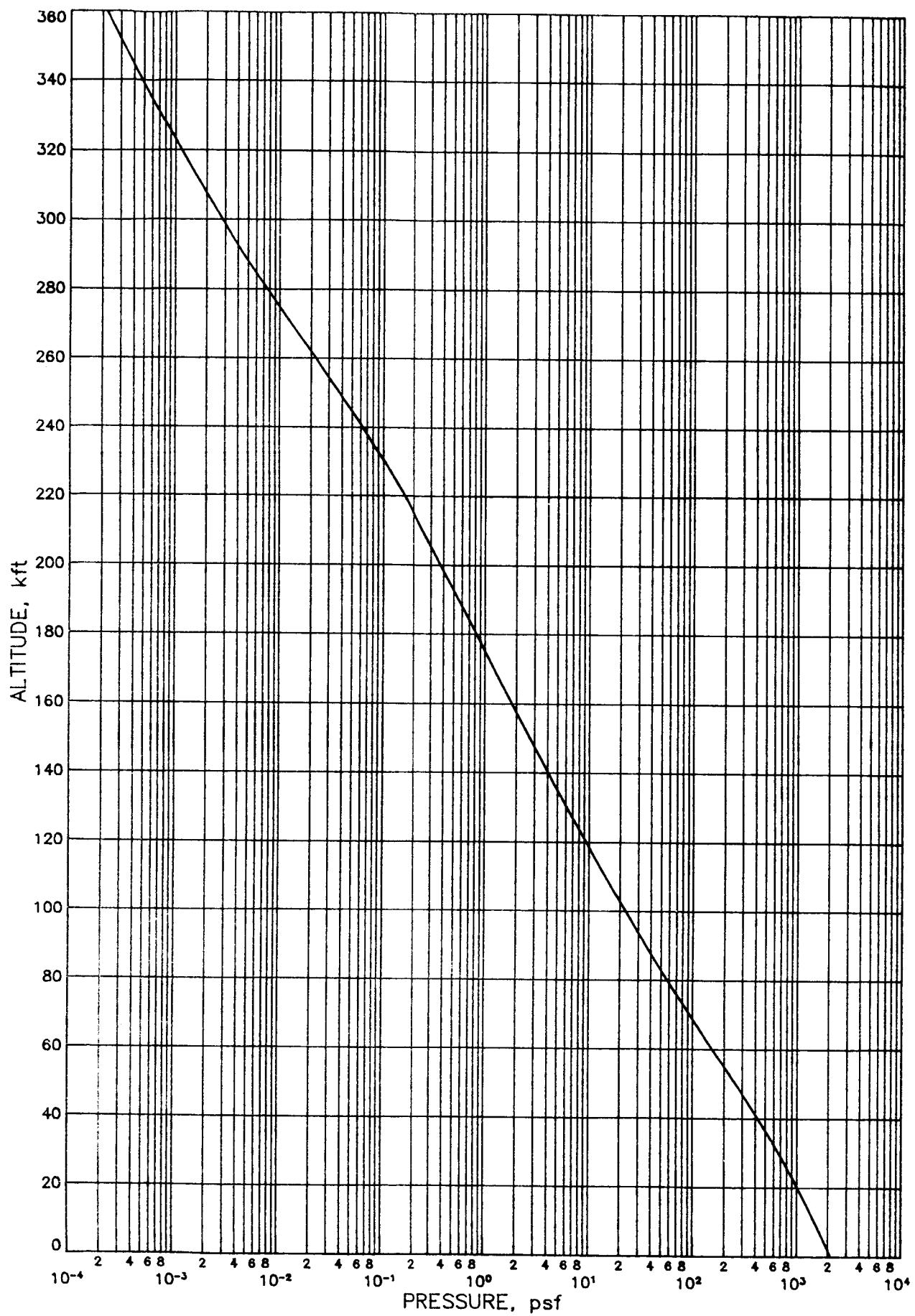


Figure II-10 Final pressure profile for STS-19 (51-A)

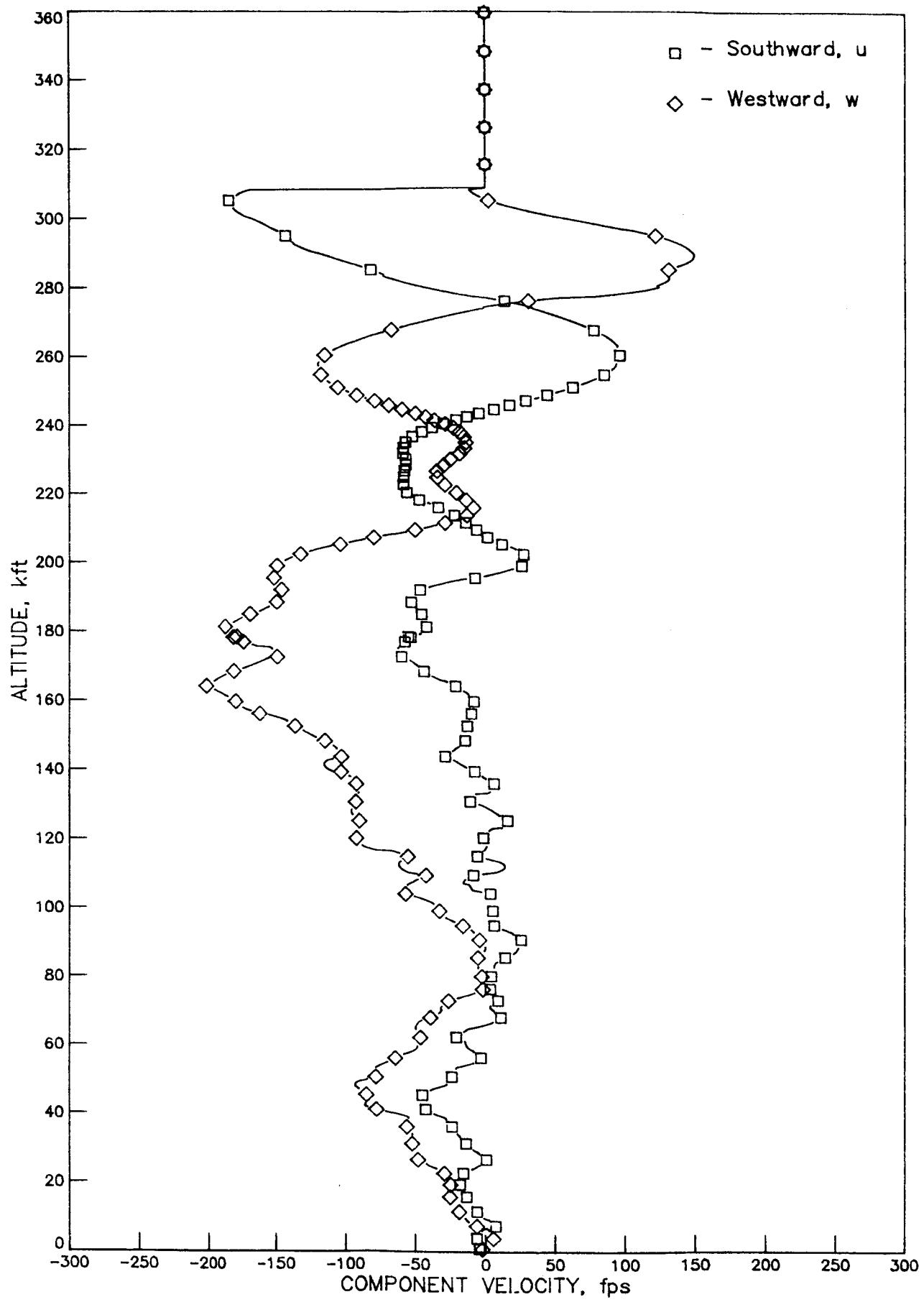


Figure II-11 Final atmospheric winds for STS-19 (51-A)

Section III. Aerodynamic BET development and summary results

This section summarizes the STS-19 aerodynamic results. These data were plotted from the primary AEROBET generated for this flight, namely, NK0165. These data were generated based on the previously discussed inertial BET and the selected atmosphere. OI data defining RCS and control surface deflections were obtained from NK0785, thinned to 1 Hz and output on reel NP0302. Mass properties utilized are given in Appendix A.

Altitude, altitude rate, dynamic pressure, and Mach number are plotted as Figures III-1 through III-4, respectively. Each are plotted versus time from epoch, with the latter three variables plotted versus altitude as well. The hypersonic viscous parameter is plotted versus altitude in Figure III-5 as is Reynolds number in Figure III-6. Air relative attitude angles; angle-of-attack, side-slip angle, and roll angle are presented versus Mach and altitude in the next two figures. The plot versus Mach number, Figure III-7, shows thereon (as a shaded region) the range of α 's flown on the previous flights.

Strip charts of the spacecraft dynamics versus Mach number are next presented (see Figure III-9).

Control surface deflections versus Mach and altitude as well as RCS activity versus Mach are shown in the next three figures. Again, Figure III-10, the plot vs. Mach, shows the previous range of control surfaces available. The additional elevon opportunities available with this flight are visible by inspection.

Figures III-13 and III-14 show the very interesting flight/data base comparison results for this mission. Again, shading is superimposed to show previous history, in this sense from a statistical perspective. The shading reflects a $\pm 1\sigma$ band around the mean prediction error computed from the ensemble flights. It is noted that the larger overprediction suggested around Mach 7 conforms to the 150 kft region discussed earlier as a potential problem area. The other obvious departure suggested near Mach 21 occurs at h \approx 220 kft and would be virtually identical no matter which remote atmosphere were selected. This does not imply that the discrepancy is not atmospheric in origin.

The pitching moment difference curve required increased scales to avoid saturation on the plot in view of the (rather) large discrepancy with respect to the data base. This was only true when plotted as a percentage difference in the 65% reference, not when

presented in the flight c.g. (Figure III-15). This also had to be done for STS-17 which heretofore governed the most negative (upward) hypersonic elevon setting. Consequently, that flight also had been the most forward c.g. flight until STS-19. Thus, over the past two flights the forward c.g. envelope has increased by approximately 4-5 inches. This flight's longitudinal c.g. profile versus Mach is shown as the last figure herein with the previous flights superimposed thereon.

h , kft

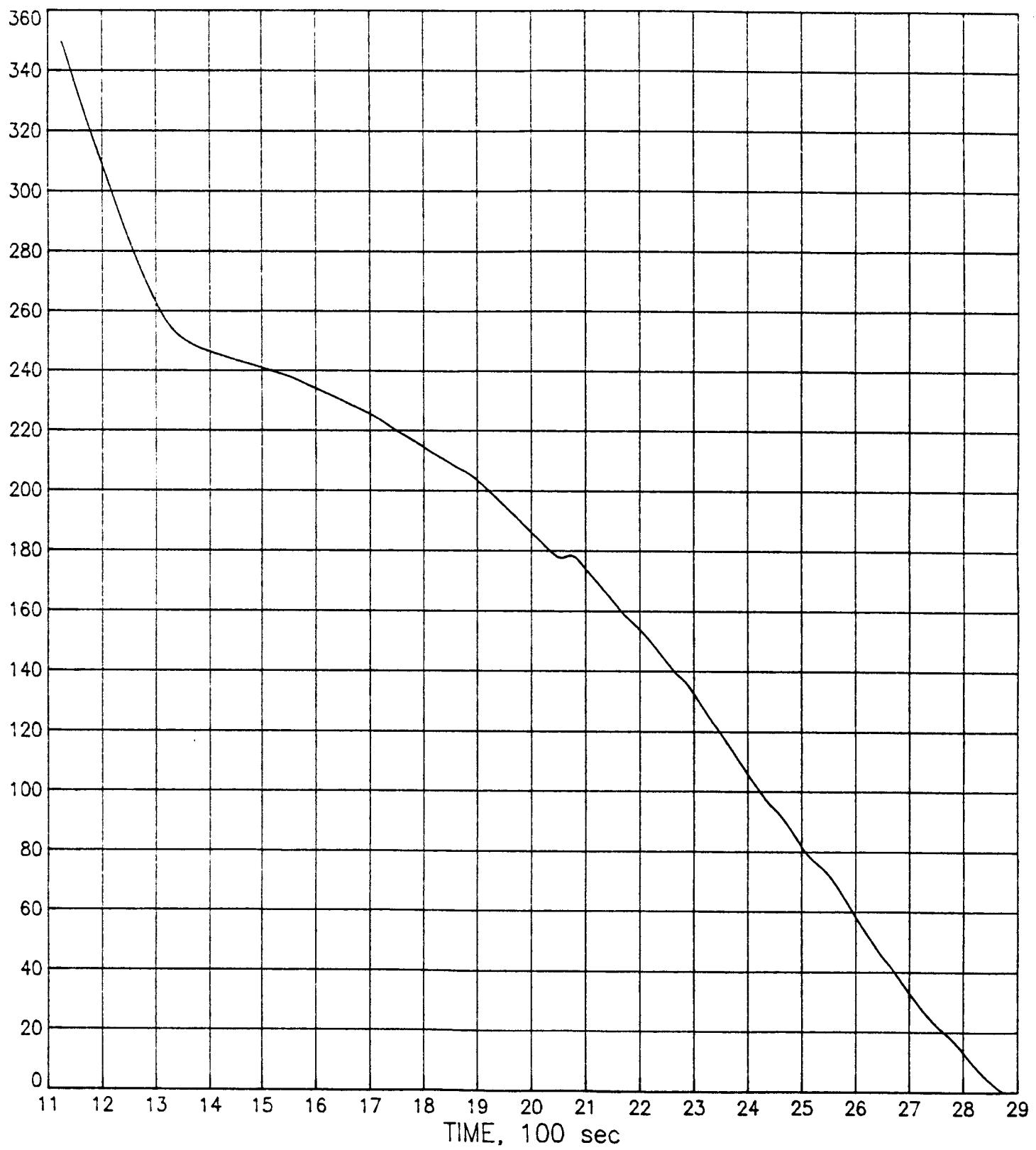
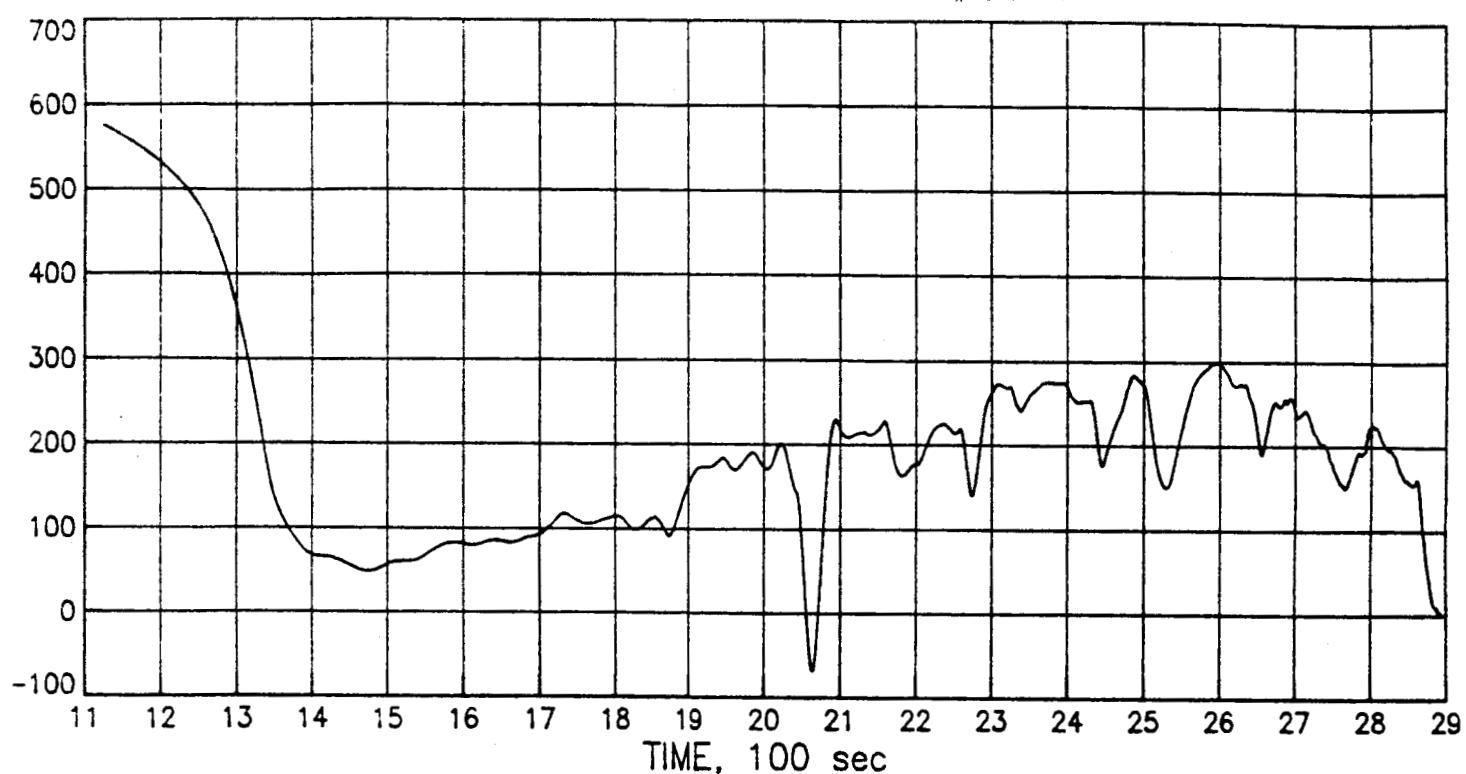


Figure III-1. STS-19 altitude time history

w , fps



w , fps

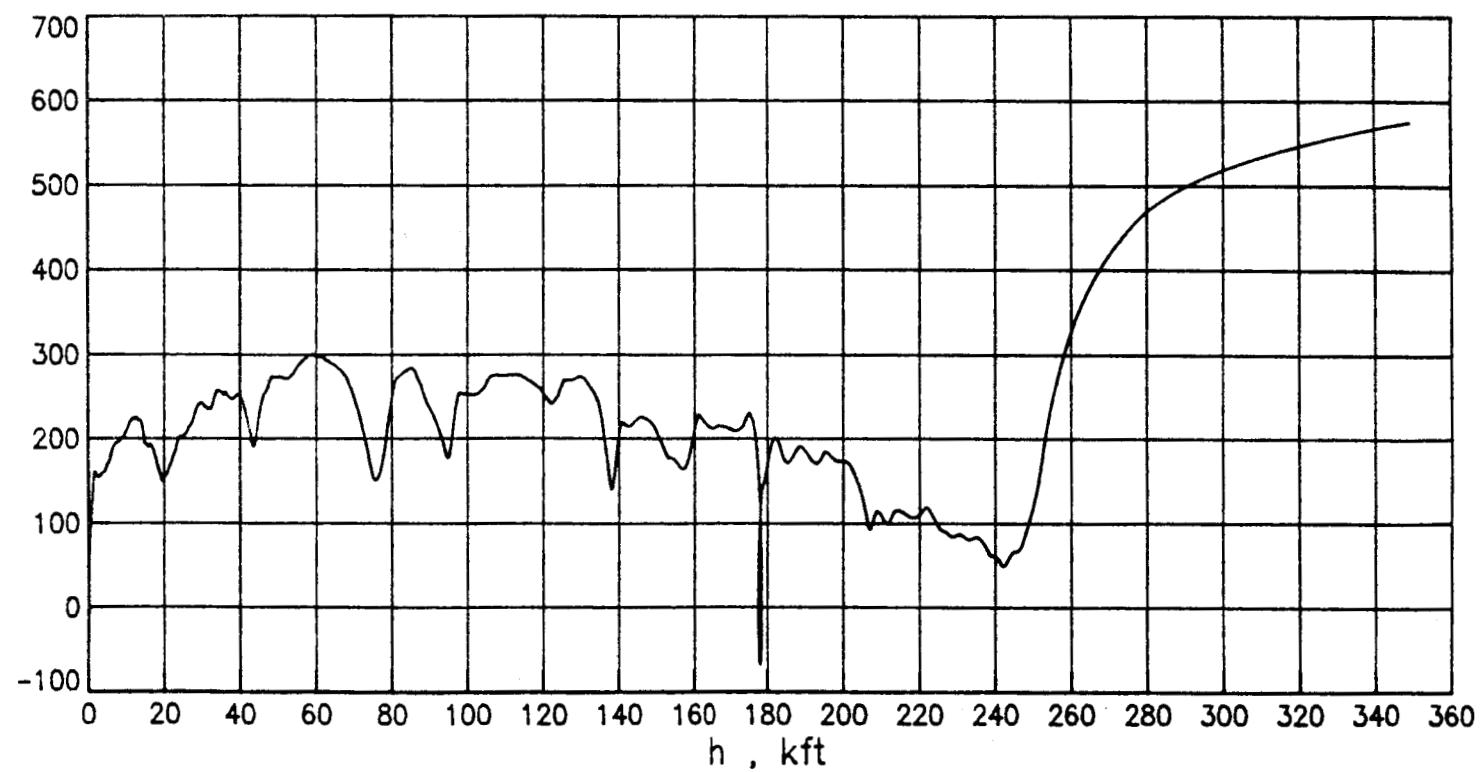


Figure III-2. STS-19 descent rate versus time and altitude

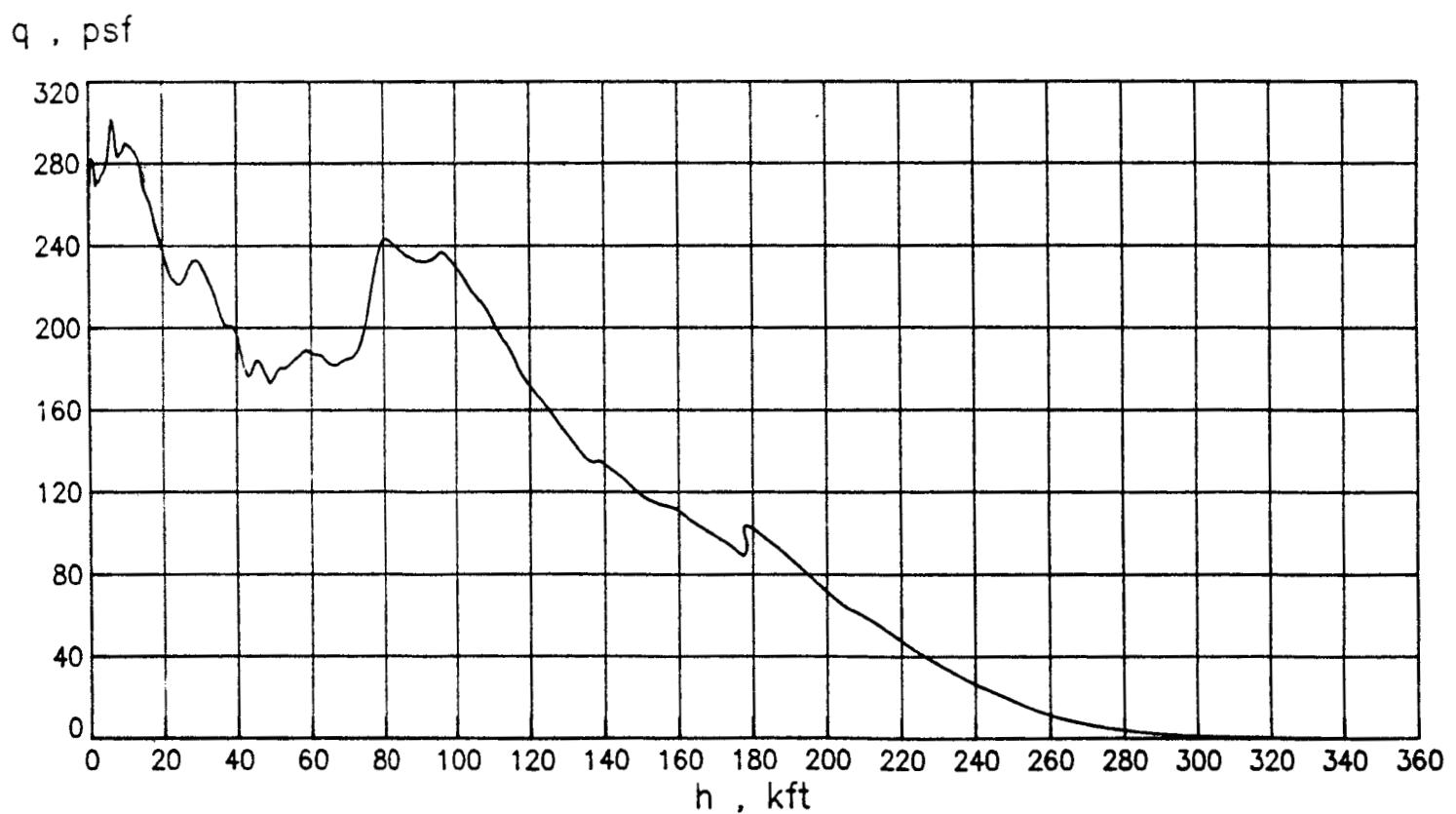
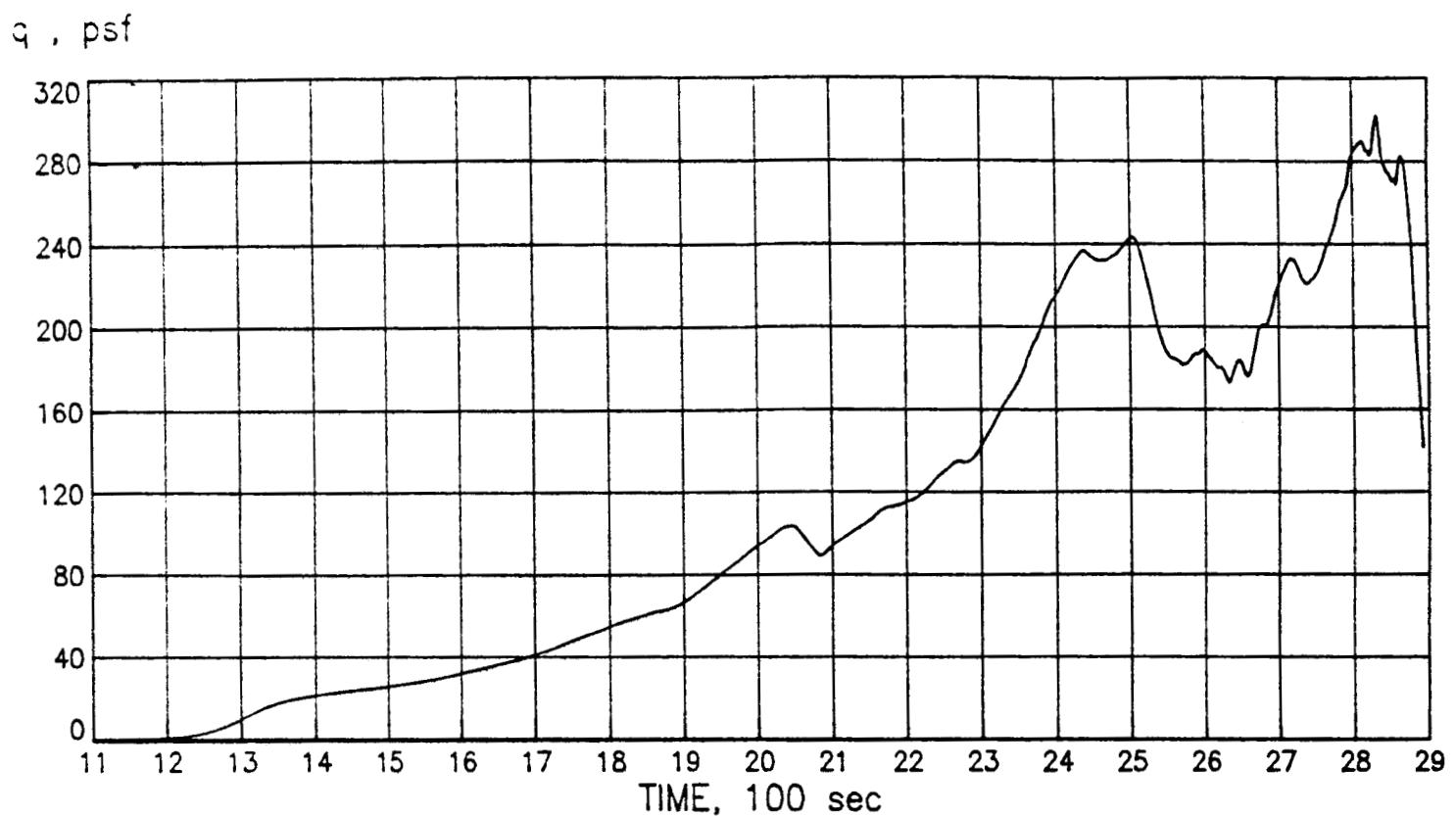
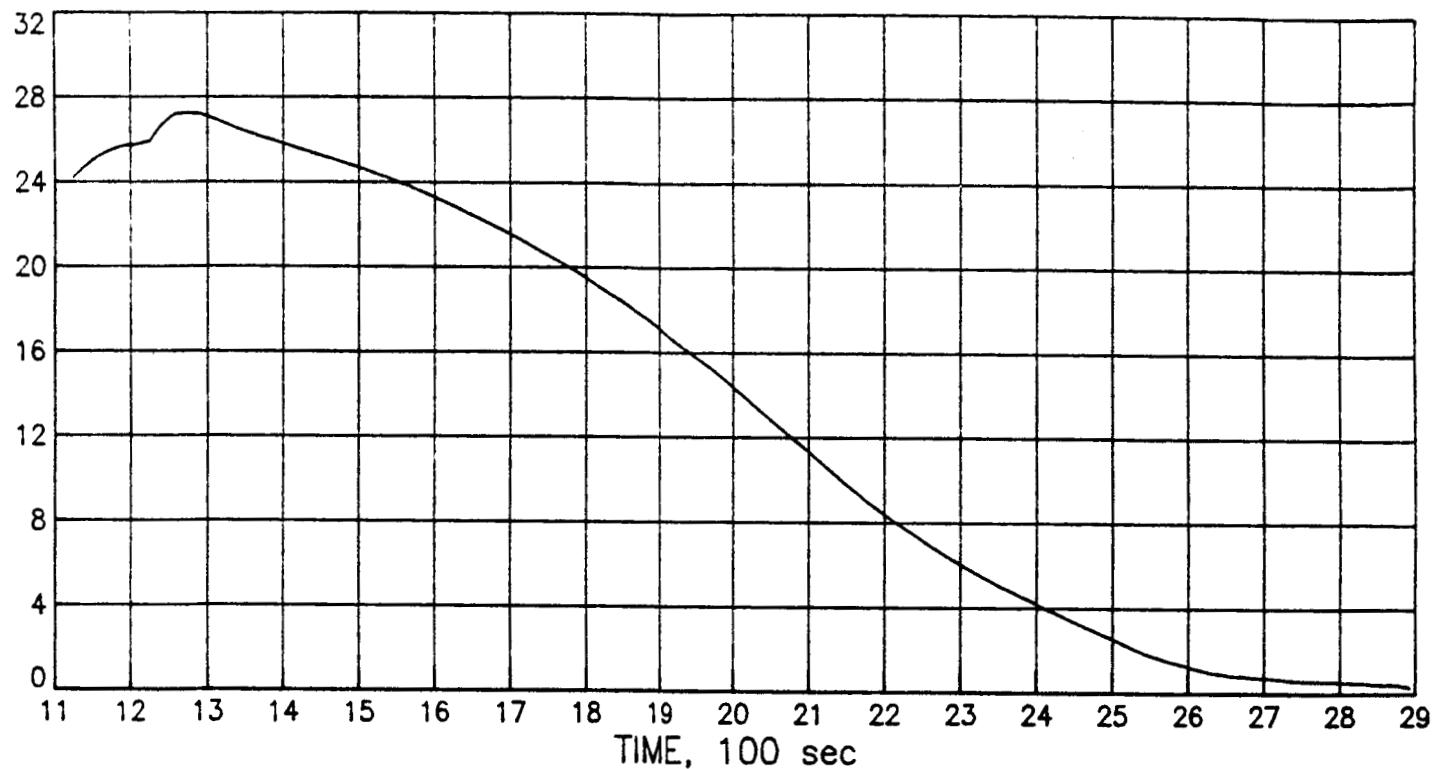


Figure III-3. STS-19 dynamic pressure vs. time and altitude

Mach



Mach

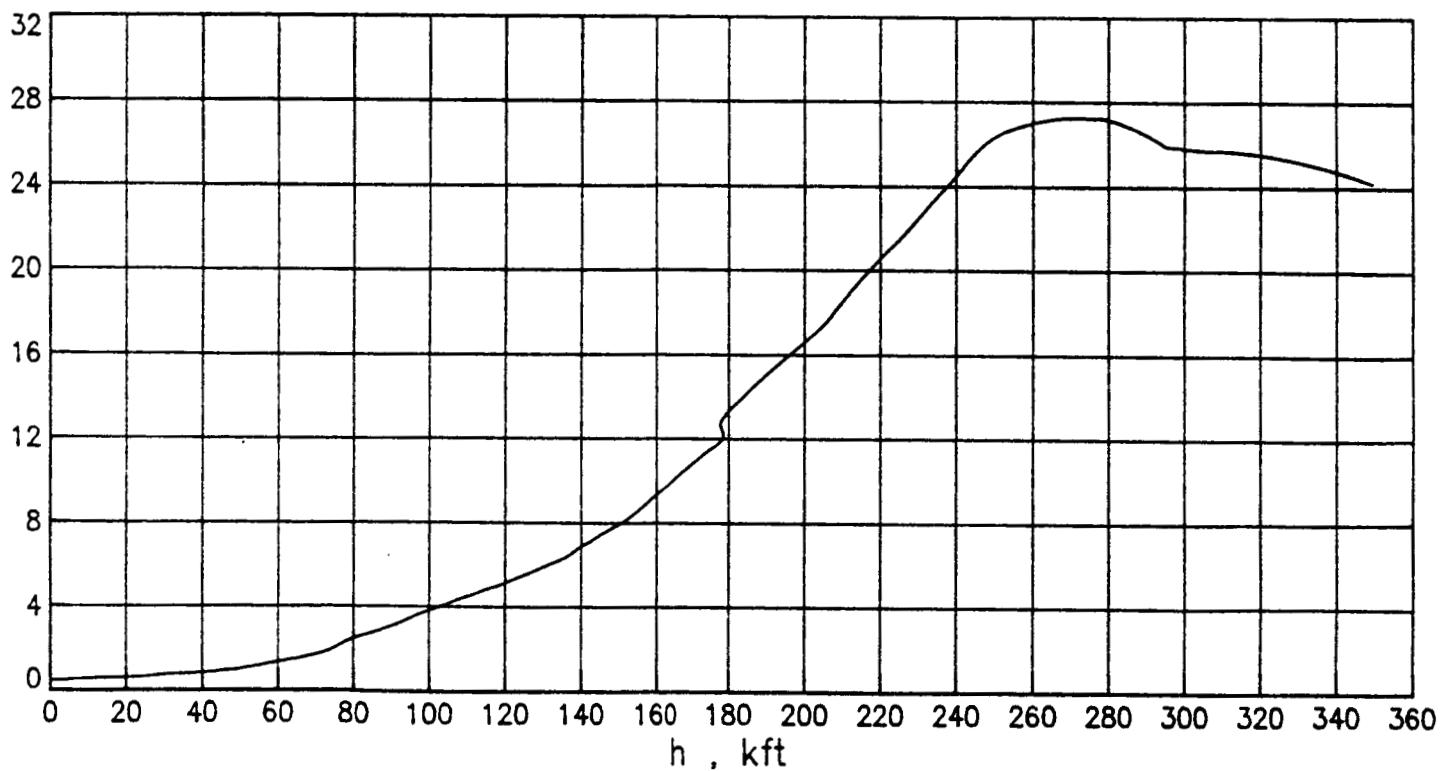


Figure III-4. STS-19 Mach number versus time and altitude

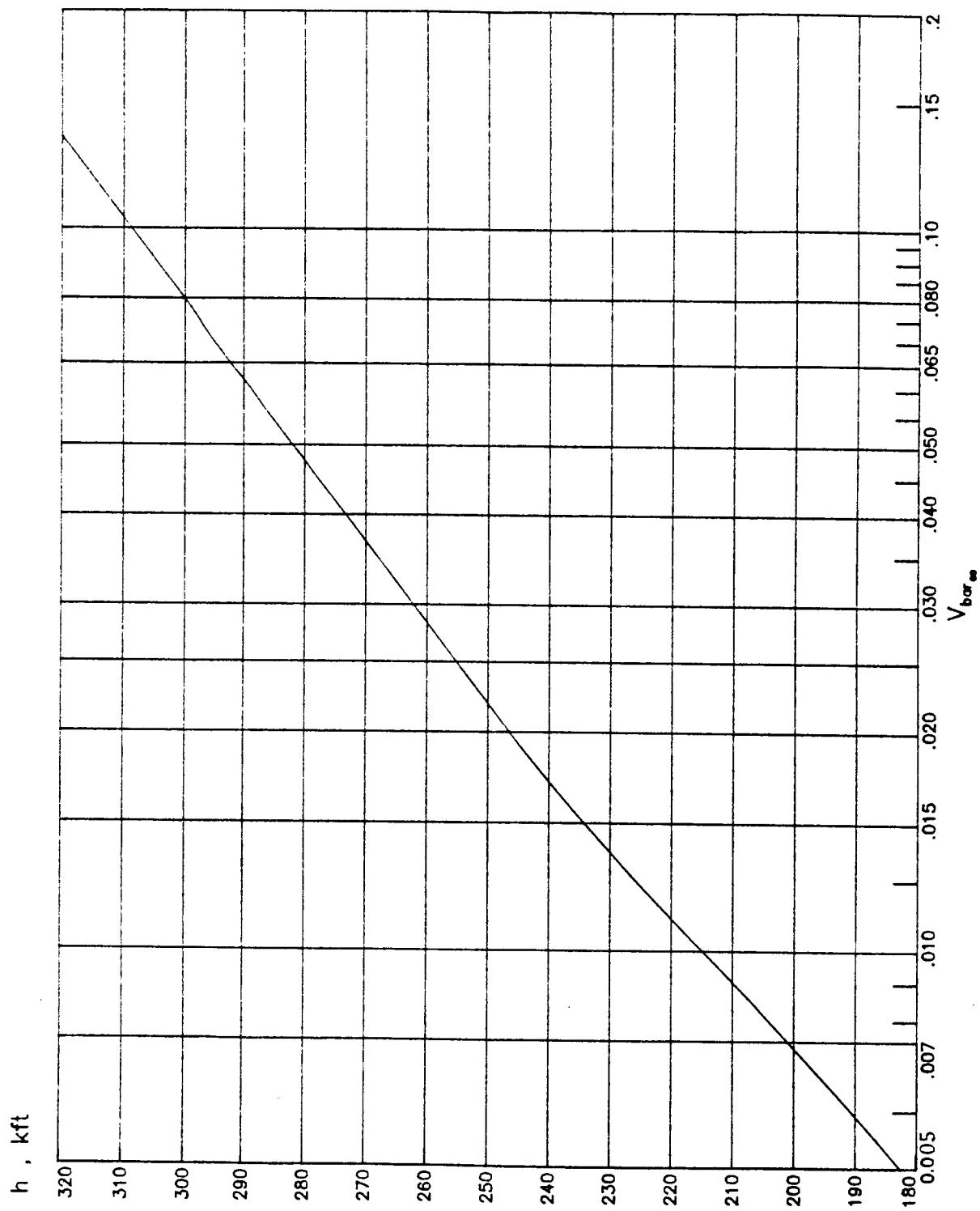


Figure III-5. STS-19 V_{bar} versus altitude

h , kft

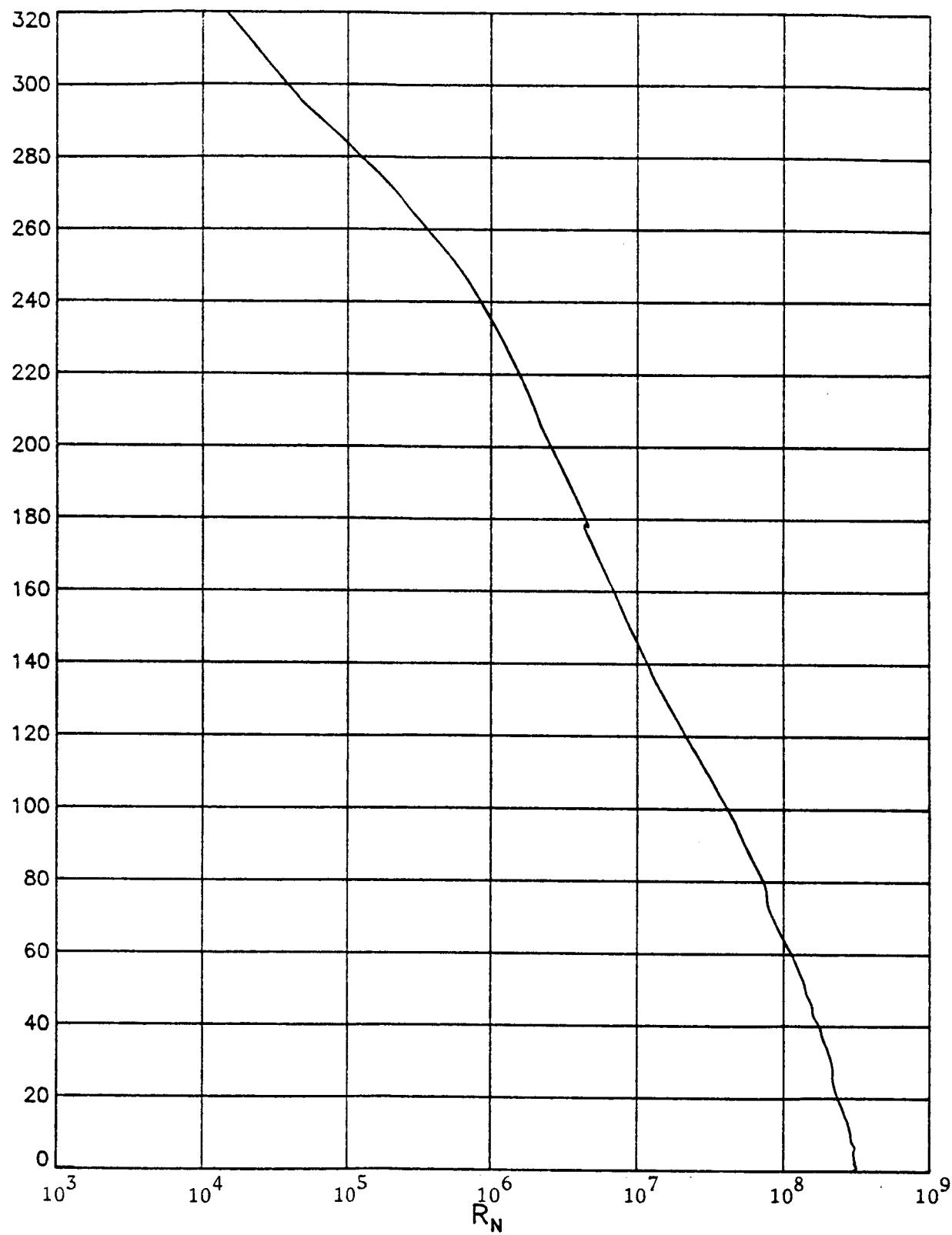


Figure III-6. STS-19 Rnum versus altitude

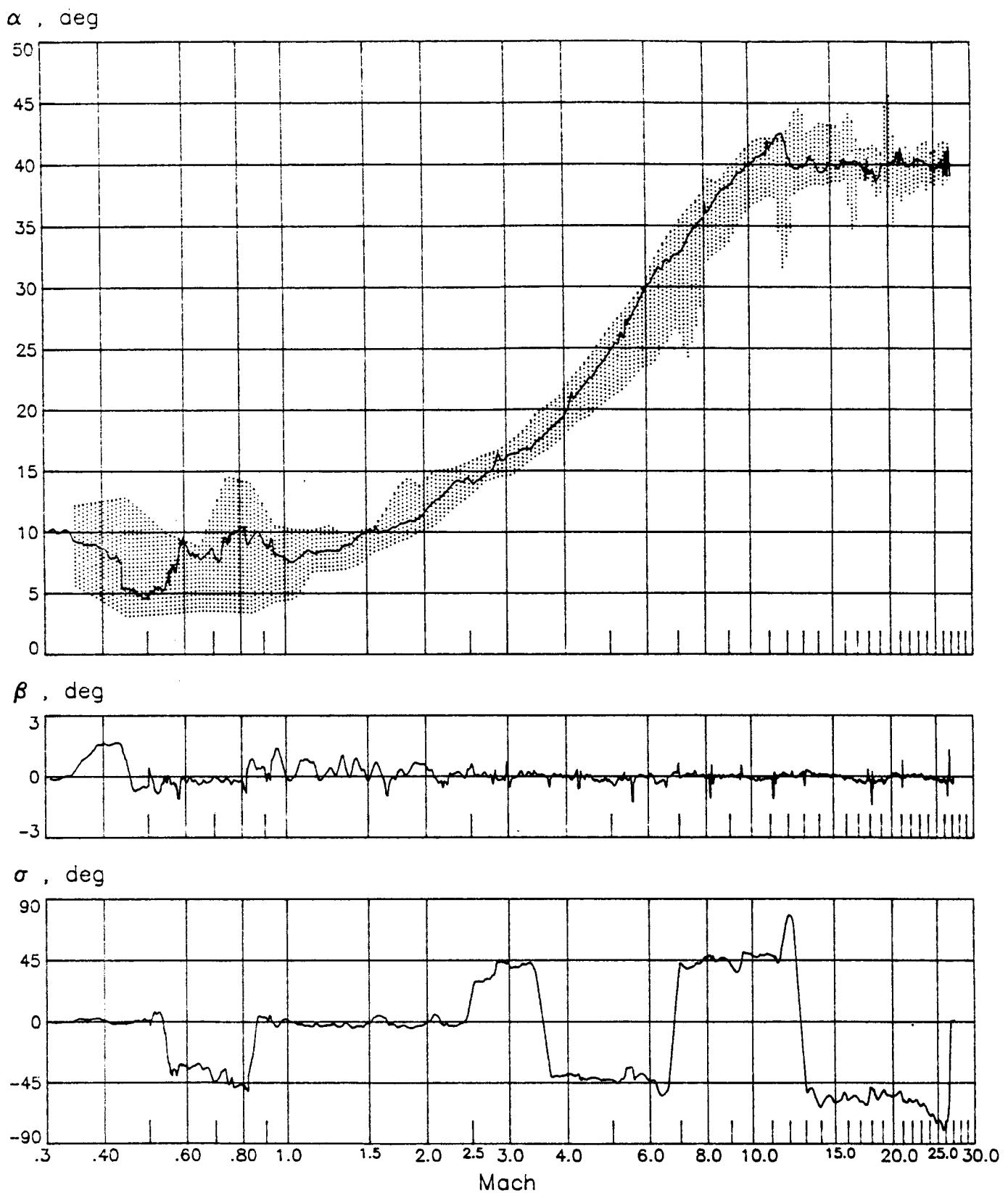


Figure III-7. STS-19 α , β and σ vs. Mach

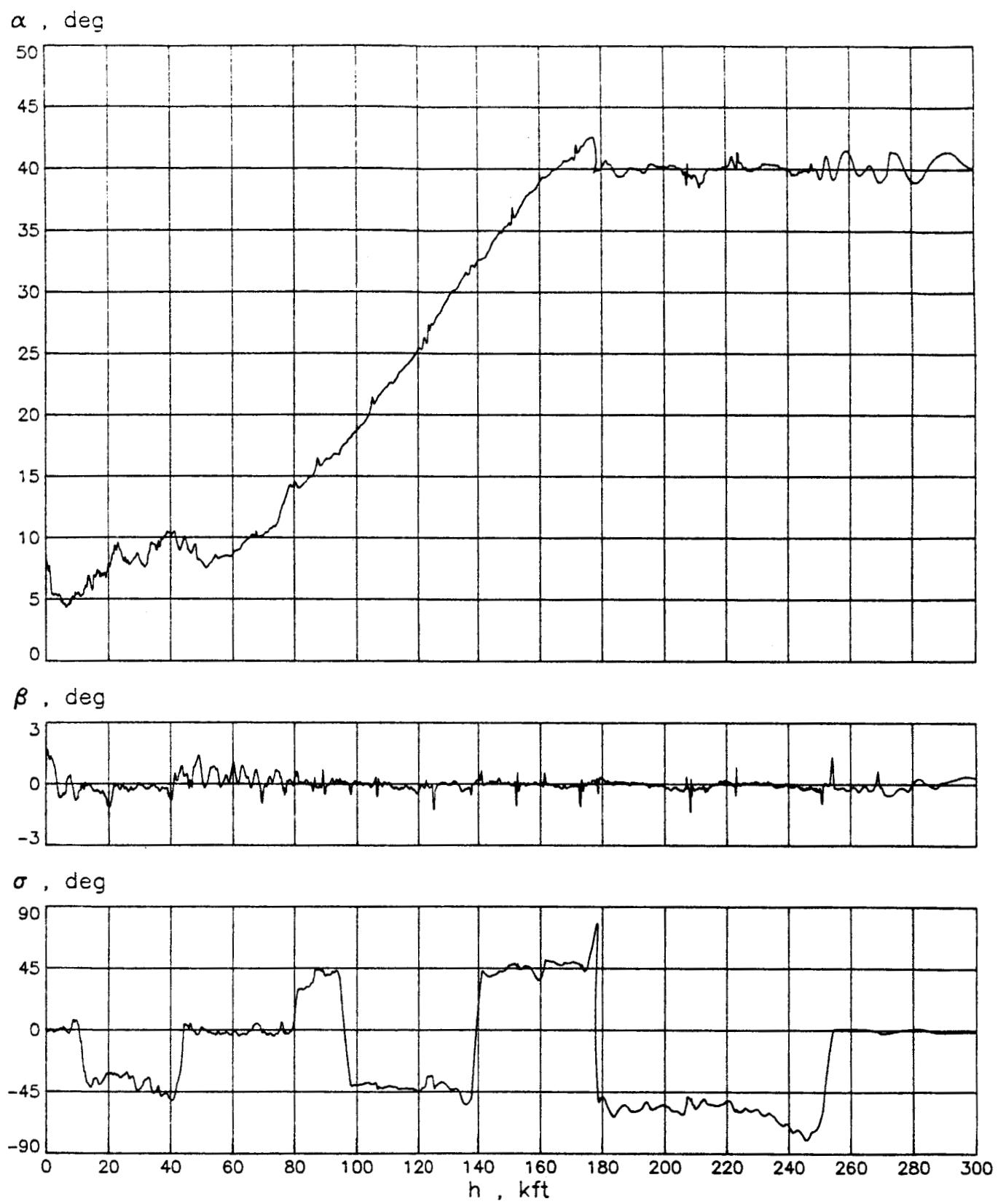


Figure III-8. STS-19 α , β and σ vs. h

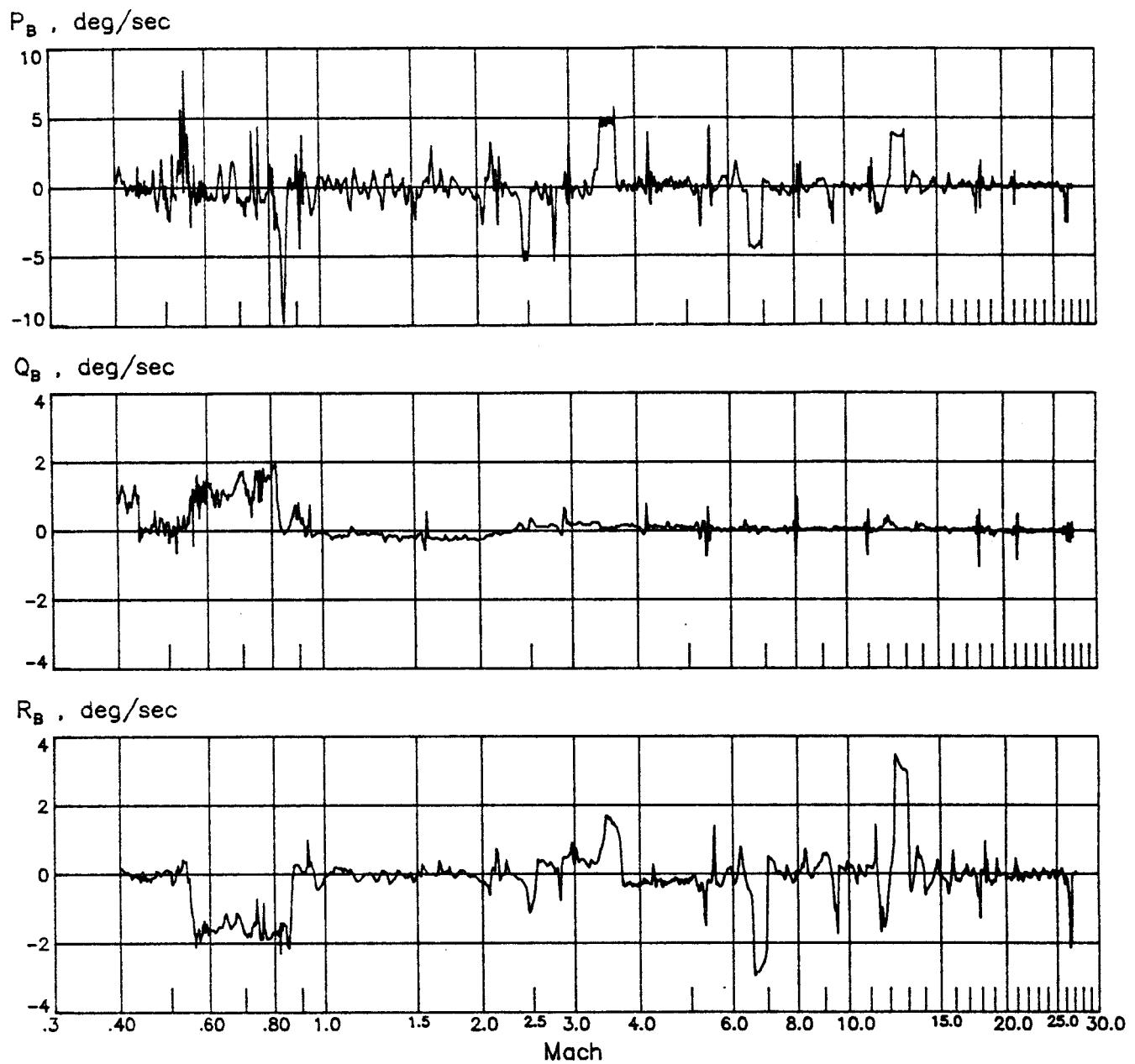


Figure III-9. STS-19 dynamic data vs. Mach

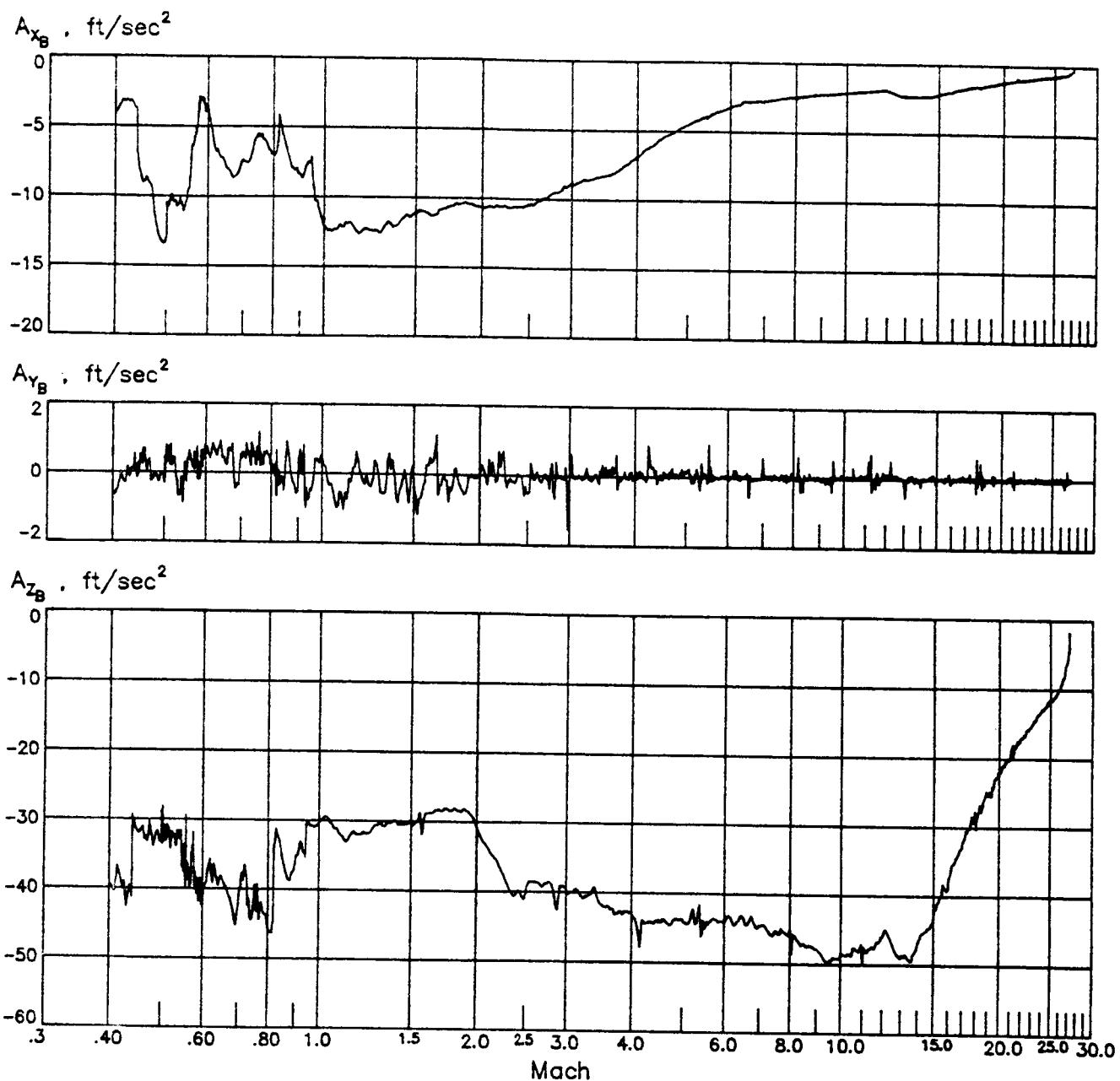


Figure III-9. (concluded)

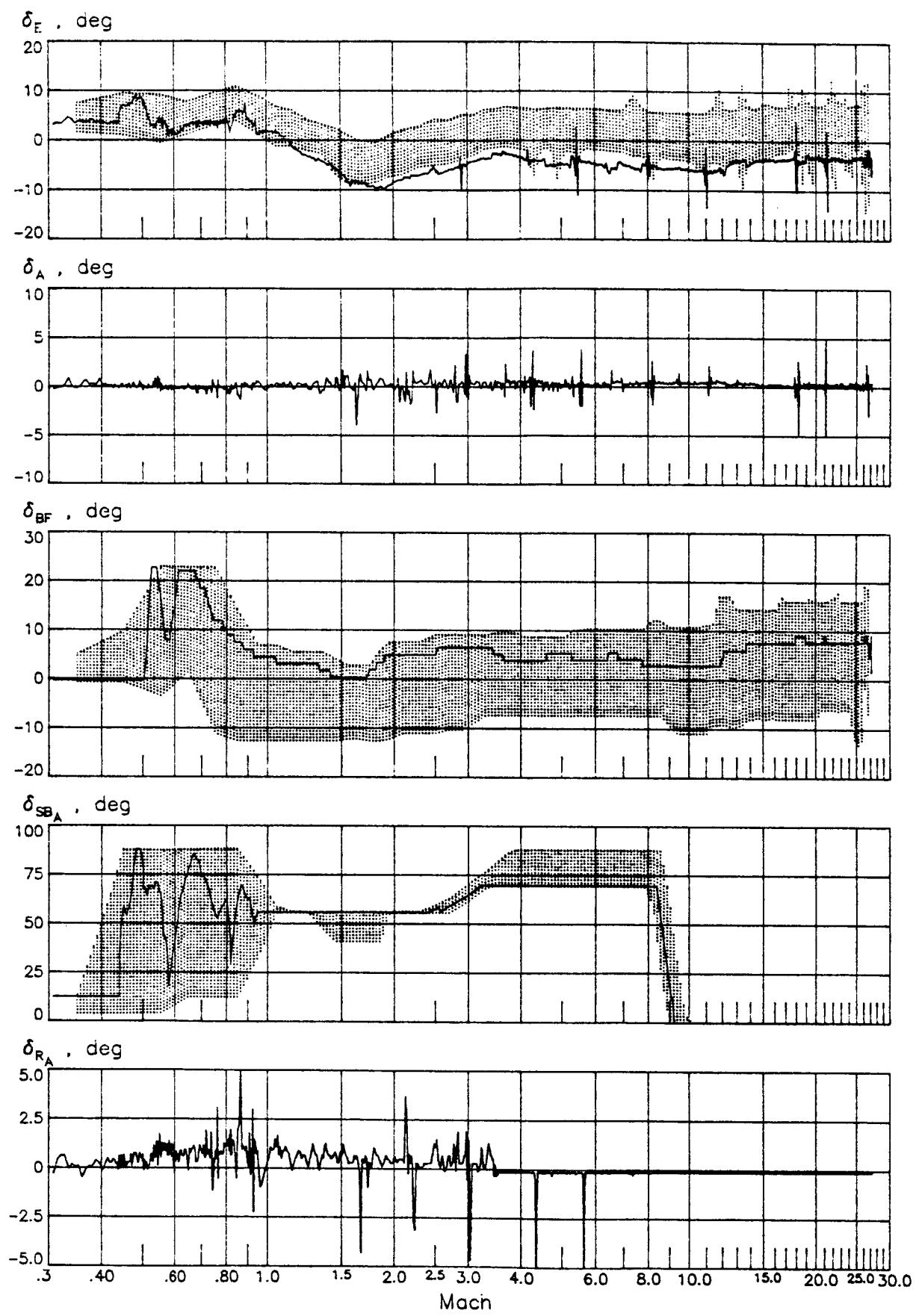


Figure III-10. STS-19 control surfaces vs. Mach

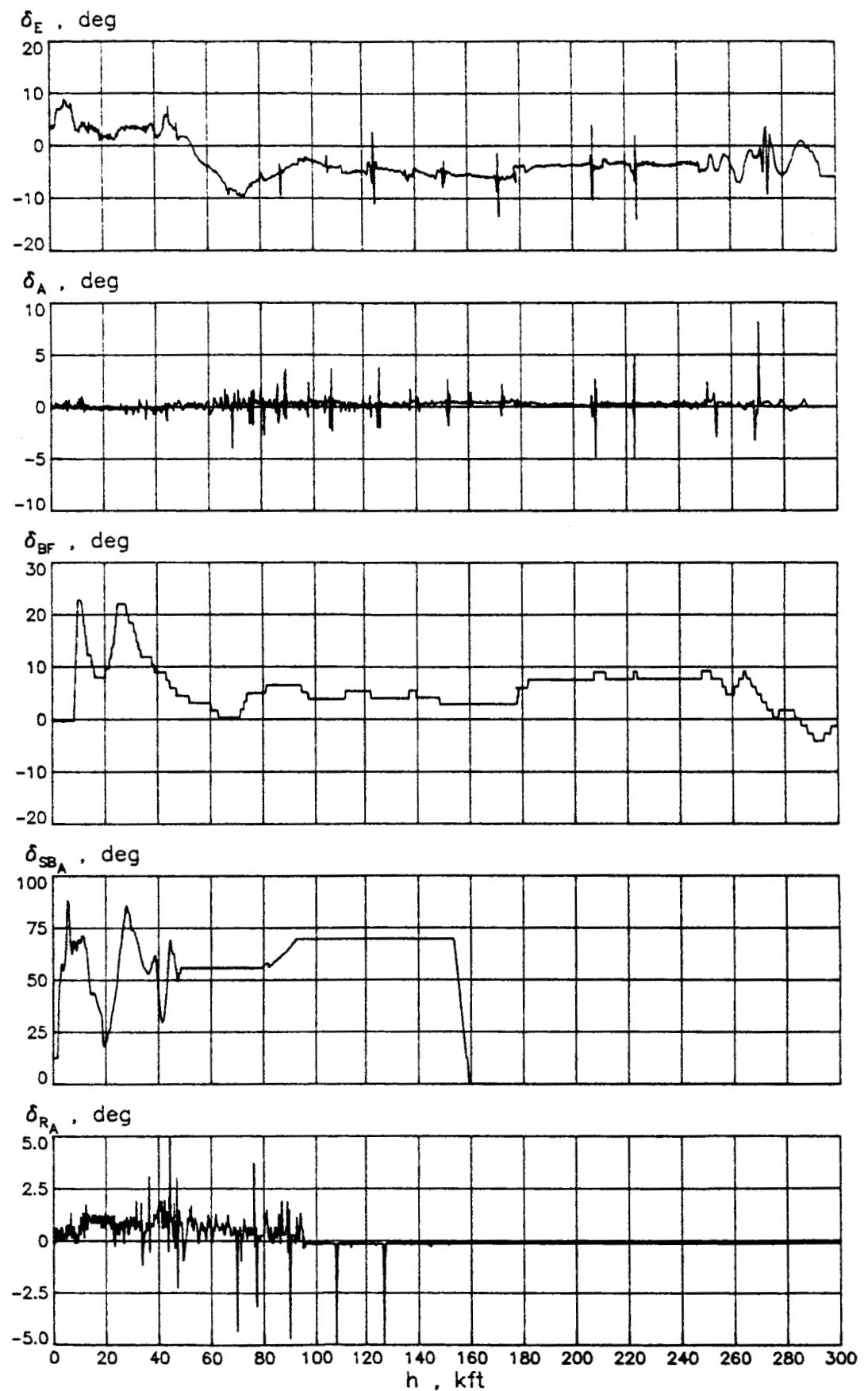
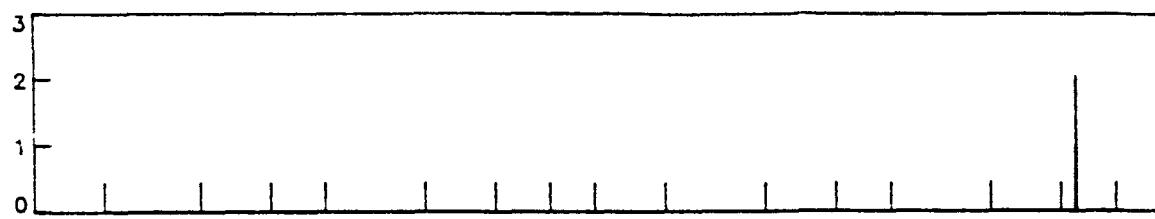


Figure III-11. STS-19 control surfaces vs. altitude

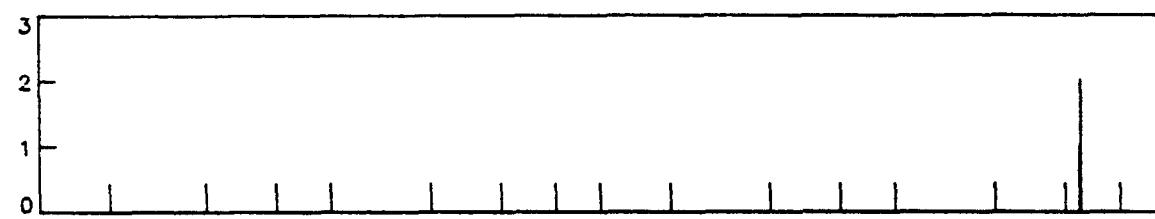
LHUF JETs



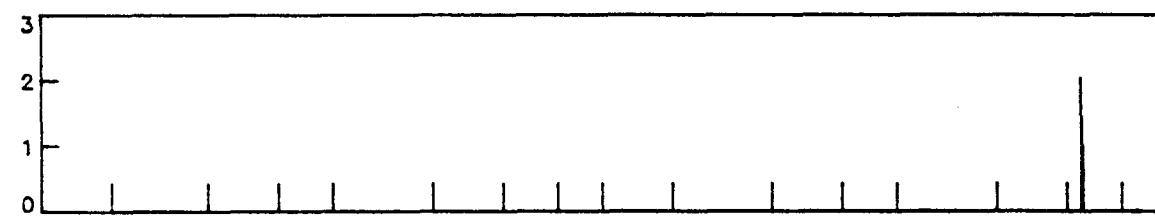
LHDF JETs



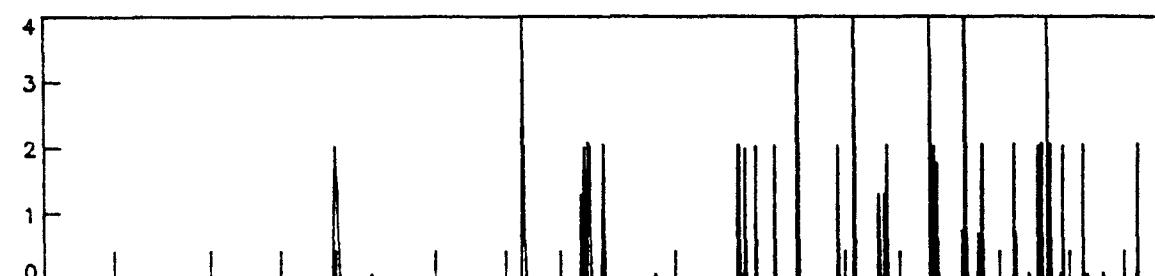
RHUF JETs



RHDF JETs



YAWP JETs



YAWN JETs

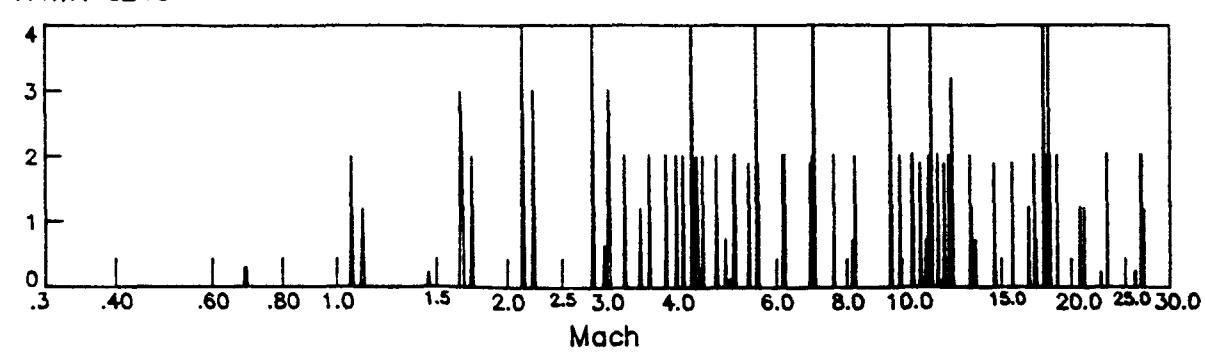
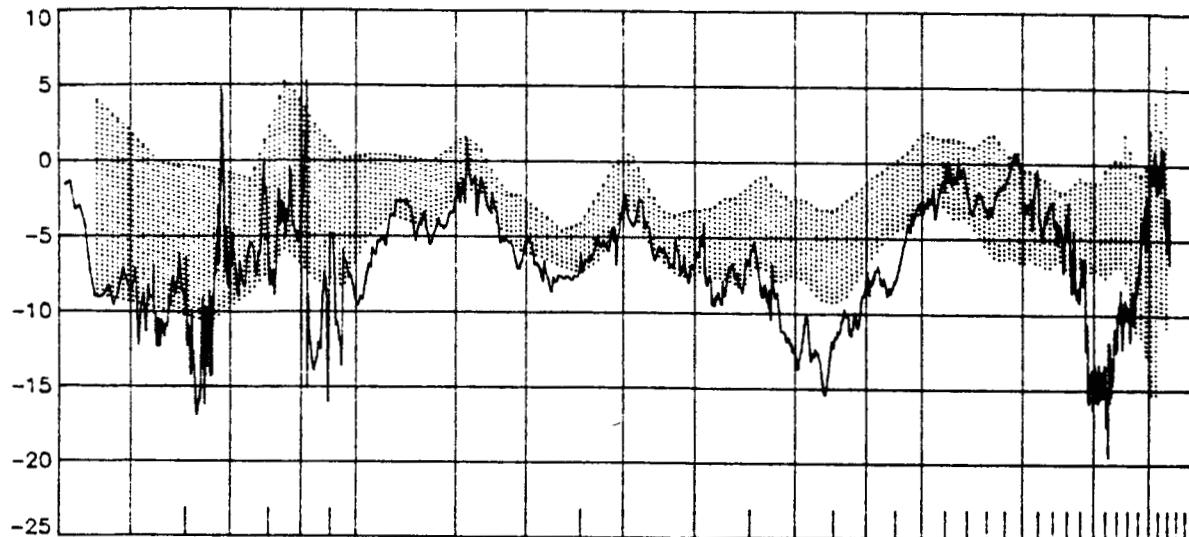
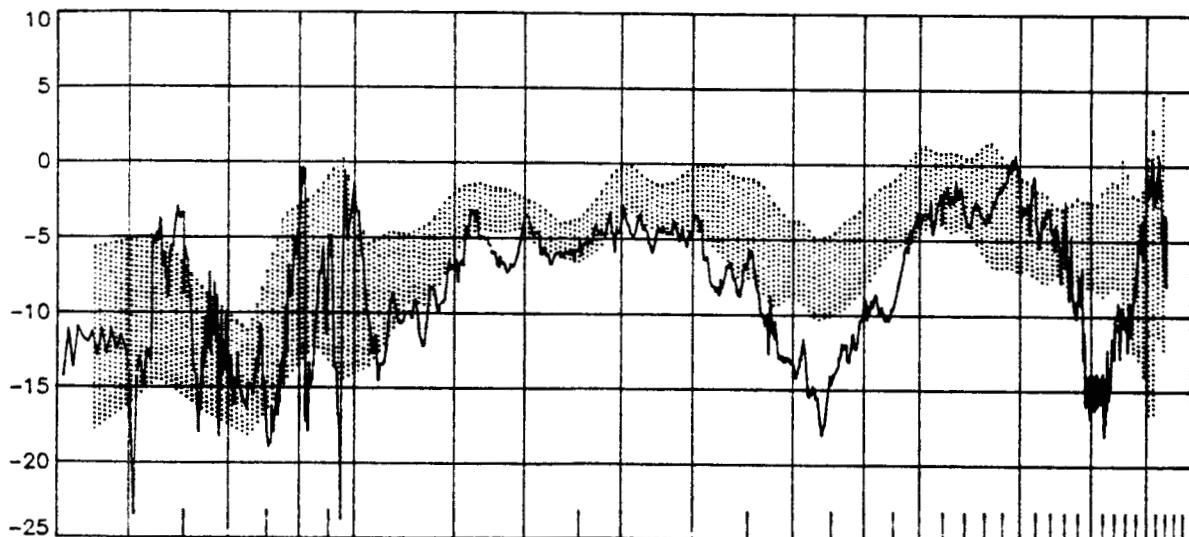


Figure III-12. STS-19 RCS firings vs. Mach

ΔC_L , percent



ΔC_D , percent



$\Delta(L/D)$, percent

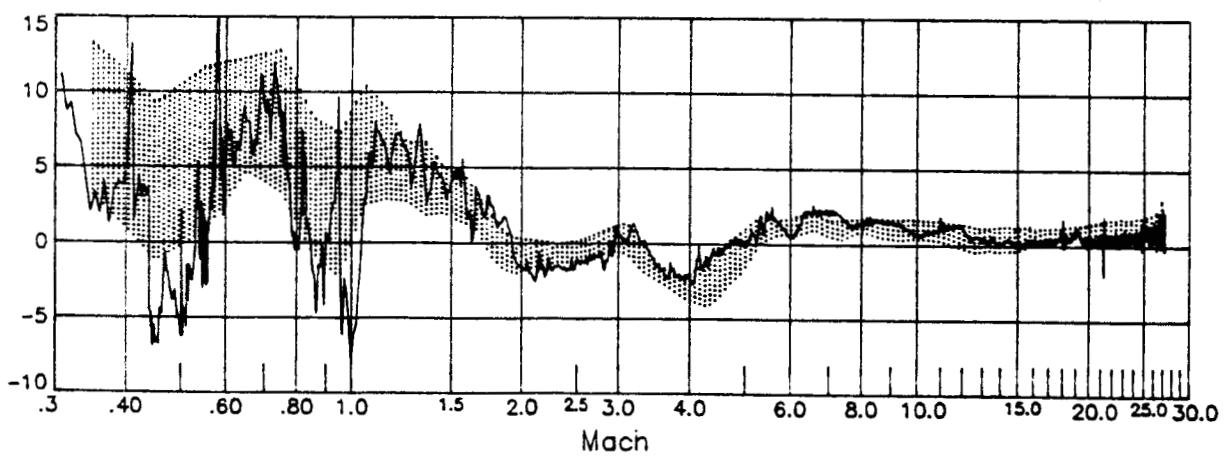


Figure III-13. STS-19 lift, drag, and L/D differences

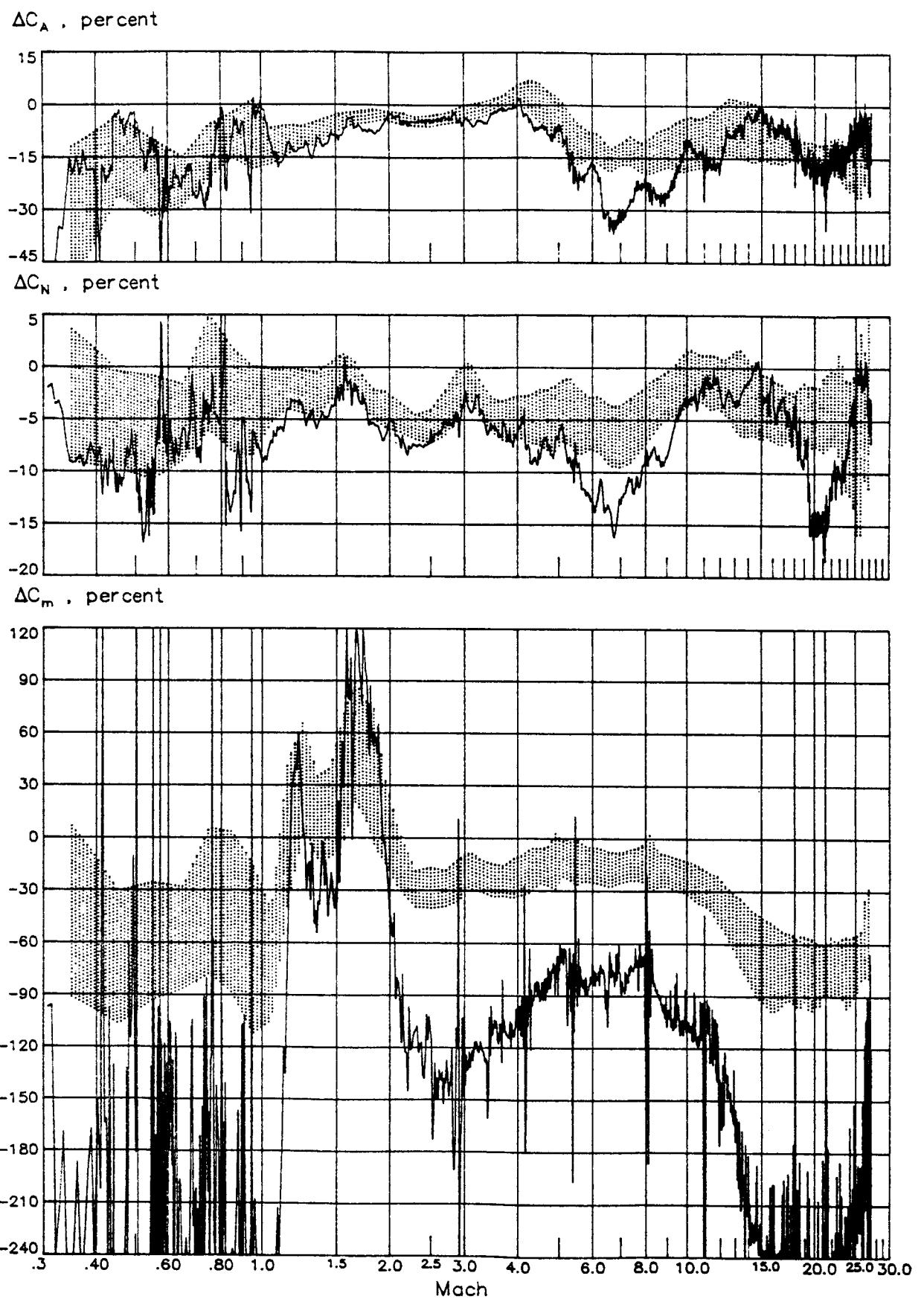


Figure III-14. STS-19 axial, normal, and moment differences

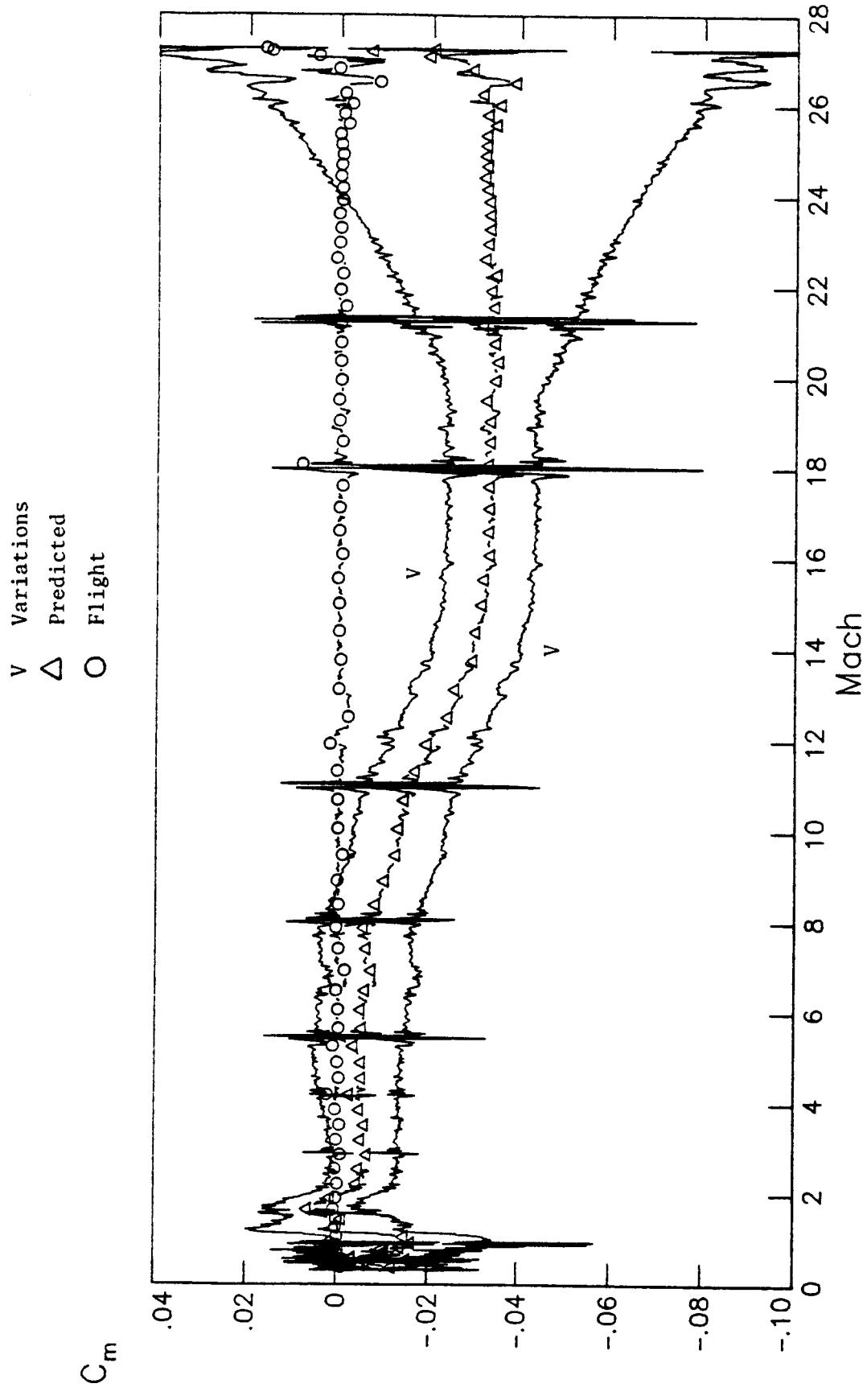


Figure III-15. STS-19 C_m comparisons vs. Mach

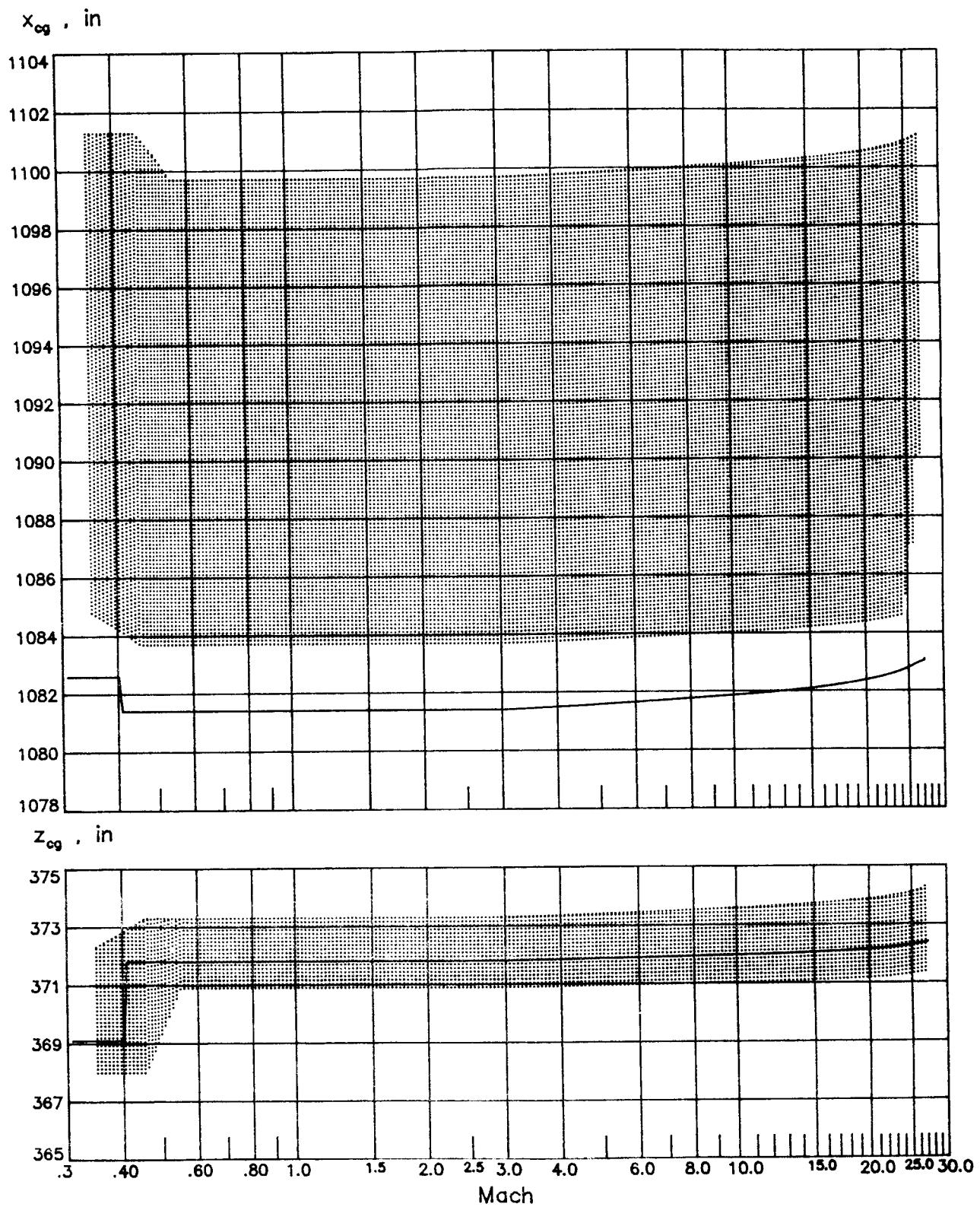


Figure III-16. STS-19(51-A) c.g. profiles vs. Mach

IV. MMLE input file generation

For this **Discovery** flight GTFILEs were created using the only two possible sources of spacecraft dynamics, i.e., IMU and RGA/AA. The IMU GTFILE was output on reel NK0202. The RGA1/AA1 file was created by incorporating these channel 1 measurements as replacements to the IMU derived body axes components. The output reel for the RGA/AA file was NK0203. The RGA/AA data were calibrated versus the IMU measurements using the time interval biases shown in **Figure IV-1**. Maneuvers effected during the mission are as given in **Table IV**. Spacecraft mass properties are given in **Appendix A**.

LONGITUDINAL MANEUVERS

START TIME		STOP TIME	
H:M:S	Sec. from epoch	H:M:S	Sec. from epoch
11:32:47	1267	11:32:57	1277
11:40:11	1711	11:40:22	1722
11:42:39.5	1859.5	11:42:52	1872
11:46:48	2108	11:46:54	2114
11:48:30.5	2210.5	11:48:37	2217
11:50:24.5	2324.5	11:50:36	2336
11:51:39.5	2399.5	11:51:43	2403
11:52:57	2477	11:53:00	2480
11:54:26	2566	11:54:30	2570
11:55:46	2646	11:55:49	2649

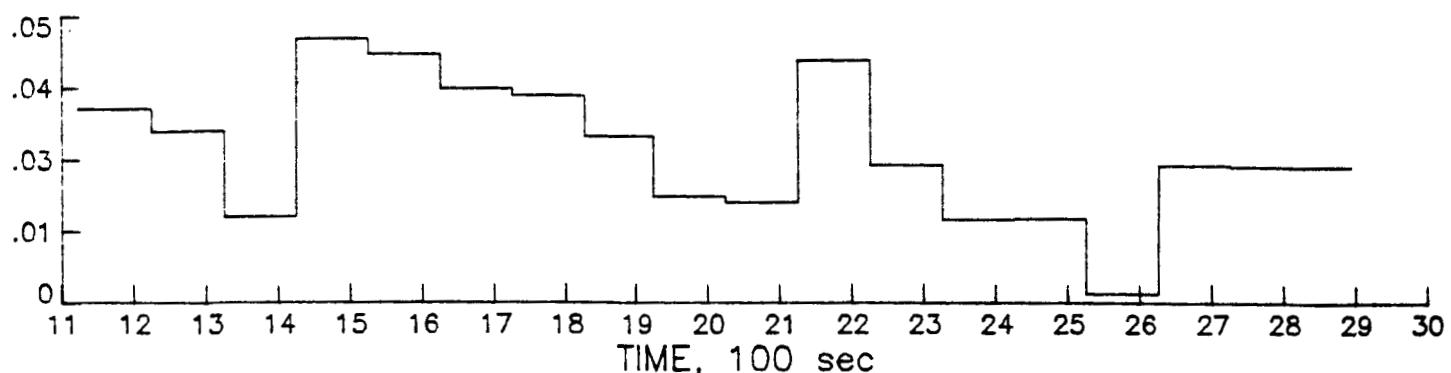
LATERAL DIRECTIONAL MANEUVERS

START TIME		STOP TIME	
H:M:S	Sec. from epoch	H:M:S	Sec. from epoch
11:32:58	1278	11:33:06	1286
11:40:21	1721	11:40:29	1729
11:42:31	1851	11:42:40	1860
11:46:40	2100	11:46:48	2108
11:48:22	2202	11:48:30	2210
11:50:20	2320	11:50:28	2328
11:51:32	2392	11:51:39	2399
11:52:48	2468	11:52:56	2476
11:53:38	2518	11:53:52	2532
11:54:19	2559	11:54:25	2565
11:55:39	2639	11:55:46	2646

Table IV. STS-19 (51-A) maneuver periods for extraction

μ_p , deg/sec

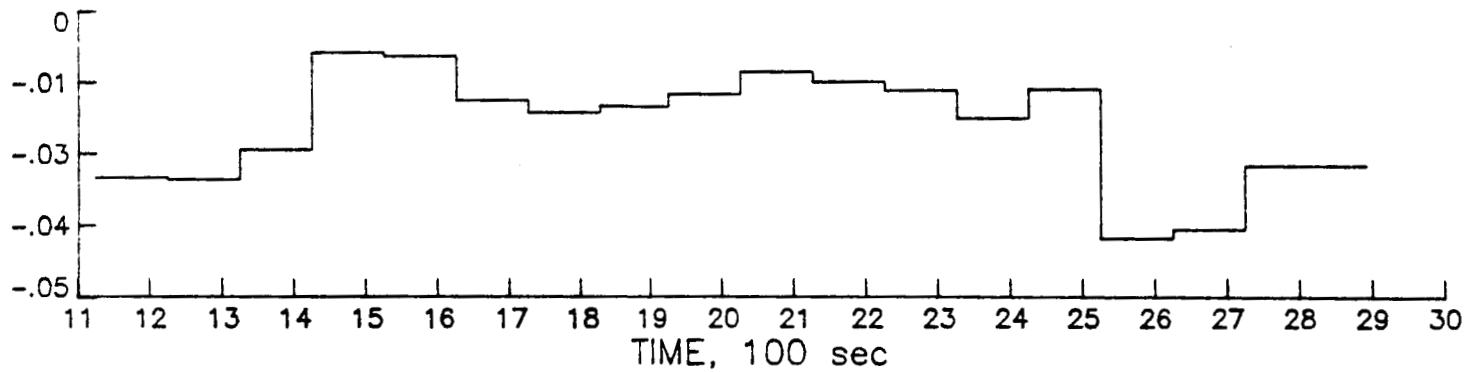
$$\sigma_\mu = .01201$$
$$\mu_{\text{avg}} = 02657$$



(a) Roll rate statistics versus time

μ_q , deg/sec

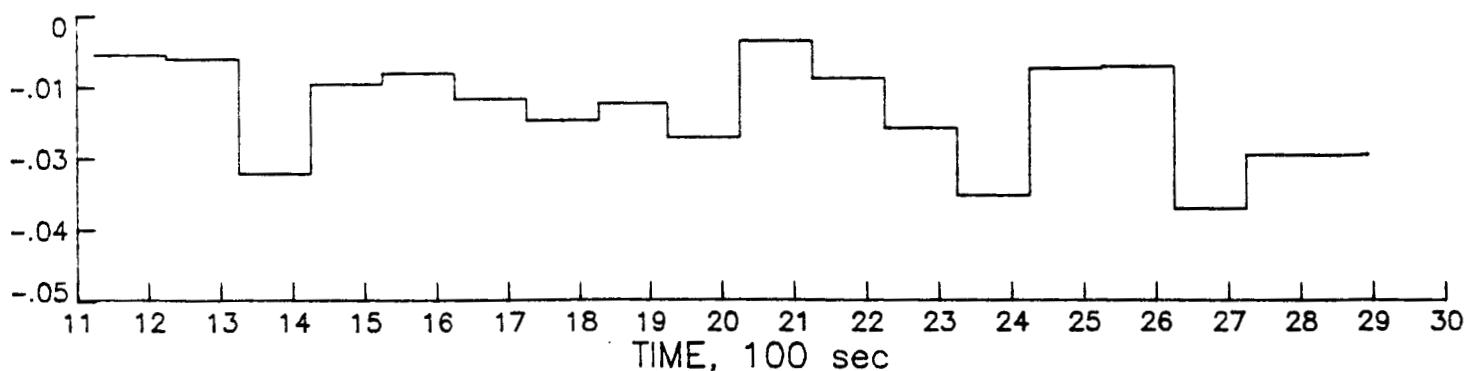
$$\sigma_\mu = .00971$$
$$\mu_{\text{avg}} = -.01992$$



(b) Pitch rate statistics versus time

μ_r , deg/sec

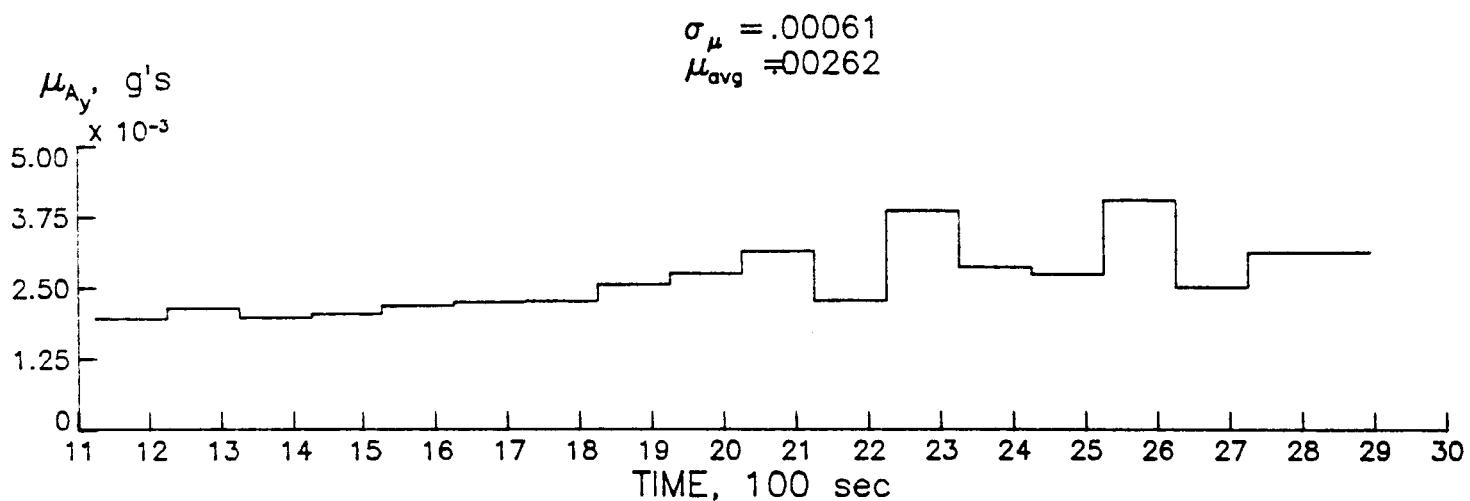
$$\sigma_\mu = .00879$$
$$\mu_{\text{avg}} = -.01641$$



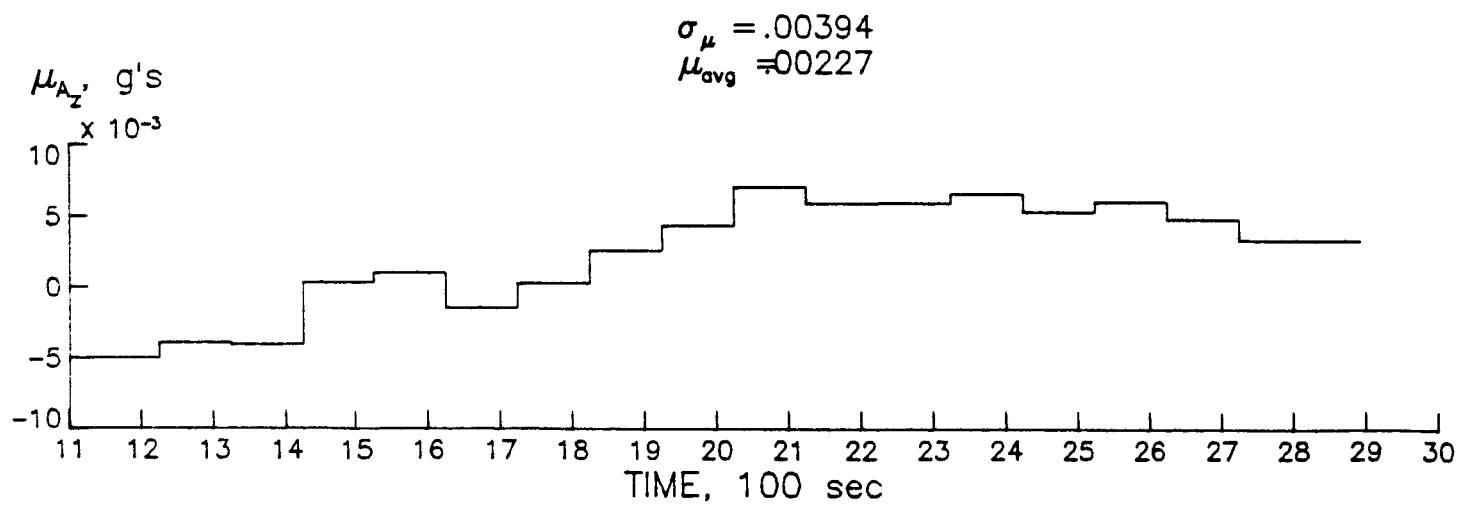
(c) Yaw rate statistics versus time

Figure IV-1. STS-19 signal differences
(IMU2 - RGA1/AA1)

NOTE: NO AXIAL CHANNEL AVAILABLE
FROM AA PACKAGE



(e) Y-body acceleration statistics versus time



(f) Z-body acceleration statistics versus time

APPENDIX A
Spacecraft and Physical Constants

+++++IMU NBR 1 ATTITUDE INFORMATION++++

...INERTIAL (EE50) TO ROTATING (ETDD)			
-.72918866E+00	-.68430831E+00	.24564132E-02	
.58430448E+00	-.72919280E+00	-.22909951E-02	
.33589458E-02	.10365913E-04	.99999436E+00	
...ROTATING (ETDD) TO N-E-D			
-.67170422E-01	.55671775E-01	.99618712E+00	
-.63612852E+00	-.76992986E+00	0.	
.76699421E+00	-.63569542E+00	.87242261E-01	
...NAV BASE TO S/C BODY			
.98286611E+00	.11081625E-03	-.18432090E+00	
-.35601724E-03	.99999910E+00	-.12972003E-02	
.19432059E+00	.13405957E-02	.98236526E+00	
...NAV BASE TO OUTER ROLL			
.99999693E+00	-.22274768E-02	-.11707061E-02	
.22274753E-02	.99999752E+00	-.26077272E-05	
.11707040E-02	0.	.99999932E+00	
...PLATFORM TO OUTER ROLL			
-.58724730E+00	.79505544E+00	.15174578E+00	
-.77921999E+00	-.50459849E+00	-.37174713E+00	
-.21698890E+00	-.33655099E+00	.91584783E+00	
...INERTIAL (EE50) TO PLATFORM			
.70390654E+00	-.28922021E+00	.64874285E+00	
-.56903132E+00	.36792850E-01	.74232298E+00	
-.23656390E+00	-.95655525E+00	-.16759866E+00	
...S/C BODY TO N-E-D			
.19382149E+00	-.62196077E+00	-.53554939E+00	
.26246709E+00	.56945254E+00	-.77886109E+00	
.94516323E+00	.10181707E-01	.32643865E+00	

Table A-1

STS-19 IMU attitude matrices @ epoch

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+++++IMU NBR 2 ATTITUDE INFORMATION++++

...INERTIAL (EE50) TO ROTATING (ET00)		
- .72918866E+00	- .68430831E+00	.24564132E-02
.68430448E+00	- .72914280E+00	- .22909951E-02
.33589453E-02	.10366913E-04	.99999436E+00
...ROTATING (ET00) TO N-E-D		
- .57170422E-01	.55071775E-01	.99618712E+00
- .53812652E+00	- .76992986E+00	0.
.76699421E+00	- .63564542E+00	.67242261E-01
...NAV BASE TO S/C BODY		
.28266611E+00	.11061625E-03	- .16432000E+00
- .35001724E-03	.99999910E+00	- .12972003E-02
.18432059E+00	.13405957E-02	.96246526E+00
...NAV BASE TO OUTER ROLL		
.49999707E+00	- .14653600E-02	- .19236980E-02
.14654067E-02	.99999892E+00	.23933027E-04
.19236609E-02	- .26752760E-04	.99999810E+00
...PLATFORM TO OUTER ROLL		
.54140462E+00	- .33511901E+00	.77104751E+00
- .40156511E+00	- .42503207E+00	.35310472E+00
.25372546E+00	- .80924454E+00	- .52484901E+00
...INERTIAL (EE50) TO PLATFORM		
- .47205734E+00	- .63034874E+00	.61629730E+00
.50677354E+00	.37794728E+00	.77473617E+00
- .72134417E+00	.67805971E+00	.14101082E+00
...S/C BODY TO N-E-D		
.19301707E+00	- .82201170E+00	- .53576106E+00
.26279853E+00	.56938958E+00	- .77892958E+00
.94534694E+00	.95490357E-02	.32592557E+00

Table A-1

(continued)

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+++++TMJ NBR 3 ATTITUDE INFORMATION+++++

...INERTIAL (EE50) TO ROTATING (ET00)

-.72918966E+00	-.68430831E+00
.68430446E+00	-.72919280E+00
.3356945E-02	.10366913E-04

.24564132E-02
-.22909951E-02
.99999436E+00

...ROTATING (ET00) TO N-E-D

-.57170422E-01	.55671775E-01
-.63812852E+00	-.76942986E+00
.76699421E+00	-.63569542E+00

.99618712E+00
0.
.87242261E-01

...NAV BASE TO S/C BODY

.98286611E+00	.11081625E-03
-.35601724E-03	.99999410F+00
.14432059E+00	.13405957E-02

-.18432090E+00
-.12972003E-02
.98286526E+00

...NAV BASE TO OUTER ROLL

.99999950E+00	-.67501024E-03
.67503720E-03	.99999977E+00
-.72912257E-03	.37216013E-04

.72914753E-03
-.36723830E-04
.99999973E+00

...PLATFORM TO OUTER ROLL

.35363744E+00	-.15101996E+00
-.34719936E+00	-.93757083E+00
.86847638E+00	.31329309E+00

-.92303390E+00
.20302562E-01
-.36418123E+00

...INERTIAL (EE50) TO PLATFORM

-.17977524E+00	.54070461F+00
.21471734E+00	-.79367661F+00
.95498818E+00	.27877587F+00

.82177813E+00
.56918699E+00
.26534700E-01

...S/C BODY TO N-E-D

.19259877E+00	-.82222578E+00
.26351173E+00	.56903653F+00
.94523384E+00	.83856750F-02

-.53557864E+00
-.77891014E+00
.32627195E+00

Table A-1

(concluded)

Planet Parameters

Physical Model

Polar Radius:	20,855,591.48 ft
Equatorial Radius:	20,925,741.47 ft
Rotational Rate:	.7292115147E-4 rad/sec

Gravity Model

Central mass, μ :	.1407646853E17 ft ³ /sec ²
J_2 :	.10827E-2
C_{30} :	.256E-5
C_{40} :	.158E-5
C_{22} :	.157E-5
S_{22} :	-.897E-6

Runway 15 Location:

Altitude:	-199 ft (above ellipsoid)
Geodetic Latitude:	28.632927 deg
Longitude:	279.293967 deg
Azimuth:	149.988300 deg

Location of IMU relative to center-of-gravity in Body coordinates

(Assumed constant for entry reconstruction)

X_B	56 ft
Y_B	0.0 ft
Z_B	-4 ft

Spacecraft aerodynamic reference parameters

Reference Area	2690 ft ²
Span	78.057 ft
Chord	39.567 ft

Average Attitude Computations @ Epoch (40300 sec)

	<u>IMU1</u>	<u>IMU2</u>	<u>IMU3</u>	<u>μ</u>	<u>σ</u>
ψ (deg)	53.5973	53.7039	53.8372	53.7128	0.1202
θ (deg)	-70.9376	-70.9698	-70.9500	-70.9525	0.0163
ϕ (deg)	1.7865	1.6782	1.5600	1.6749	0.1133

TABLE A-2

Planet and Spacecraft Data Used for
BT19D19, ST19BET, and AEROBET Generation

Weight and Center-of-Gravity (c.g.) Location

EVENT	TIME (sec from epoch)	WEIGHT (lbs)	X _{CG} (inches in Orbiter Structural Reference)	Y _{CG}	Z _{CG}
EI	1038	209163.7	1083.4	-0.2	372.5
M3	2472	207982.7	1081.4	-0.2	371.8
Landing	2892	207505.7	1082.6	-0.1	369.1

Moments and Products of Inertia

EVENT	I _{XX}	I _{YY}	I _{ZZ}	I _{XY}	I _{XZ}	I _{YZ}
EI	892717.1	6813738.2	7106750.5	-518.2	160614.3	-1427.0
M3	886776.1	6773938.5	7068818.4	46.4	149294.8	-1303.3
Landing	915161.5	6787282.8	7057585.3	717.1	140210.9	-1176.8

NOTES

EI values assumed at epoch

Mach 3 values held constant until gear deploy ($t=2877^S$),
landed values adopted thereafter

TABLE A-3

STS-19 mass properties

APPENDIX B

Final residuals for STS-19 trajectory reconstruction

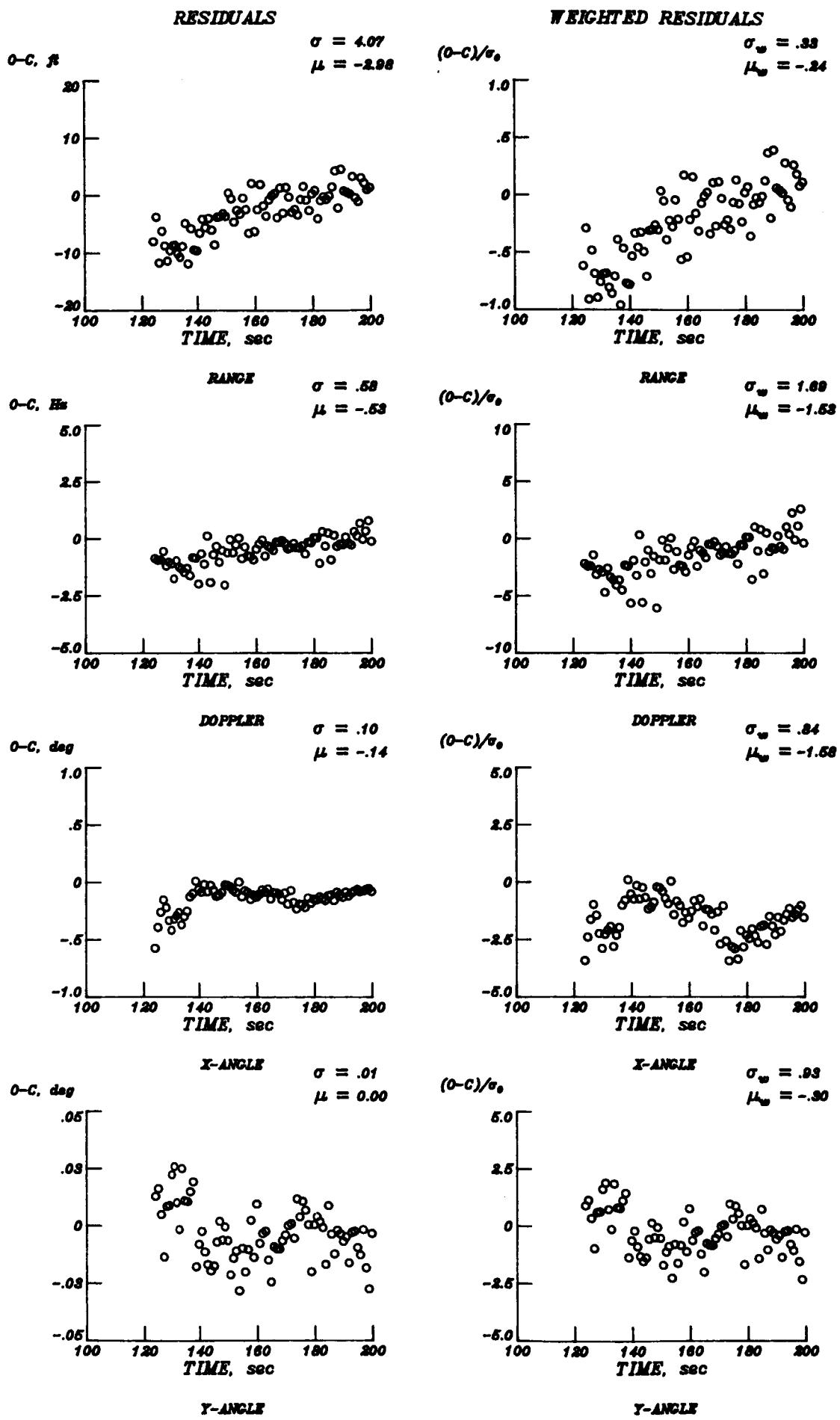


Fig. B-1. Smoothed residuals versus time for GWMS.

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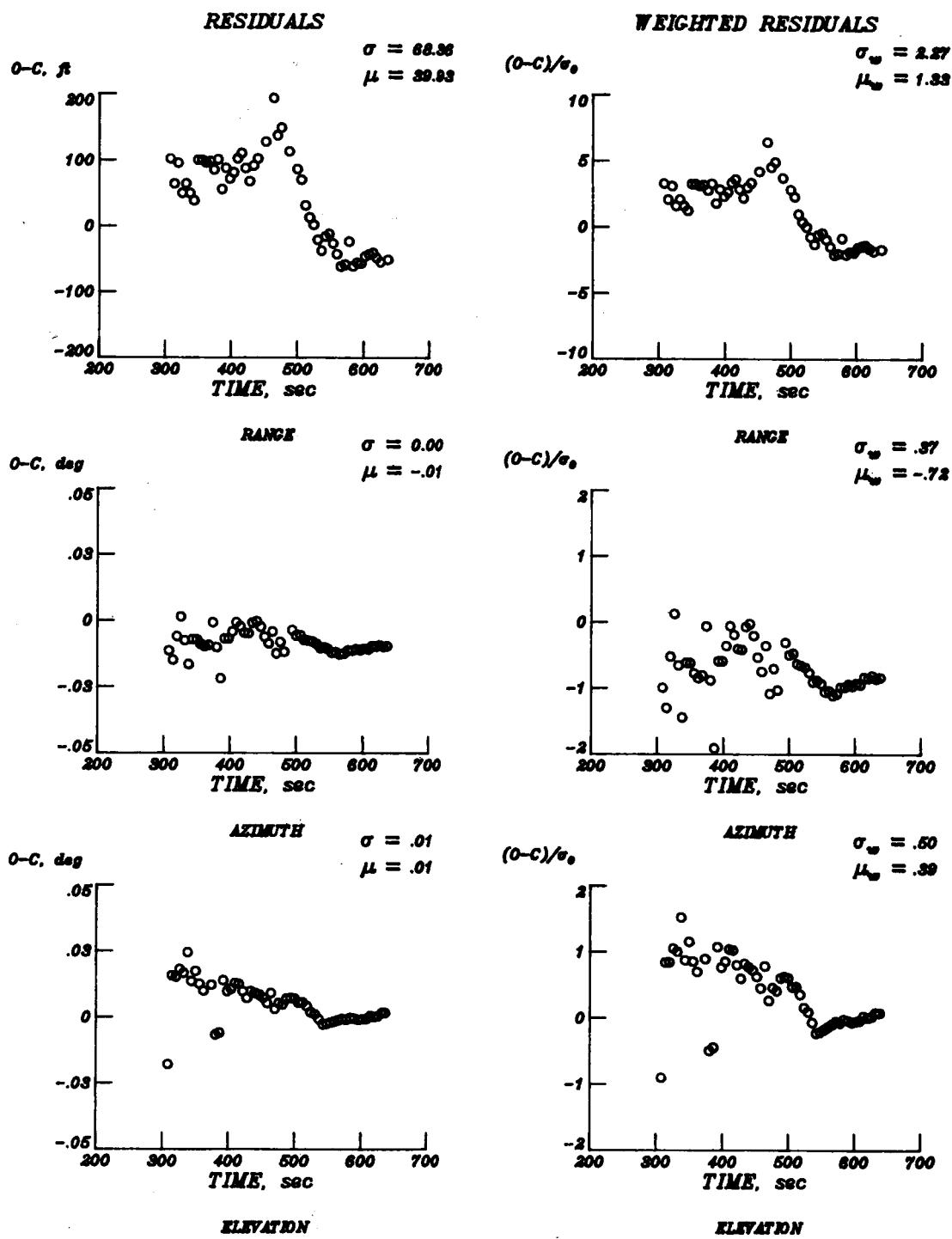


Fig. B-2. Smoothed residuals versus time for KMTC.

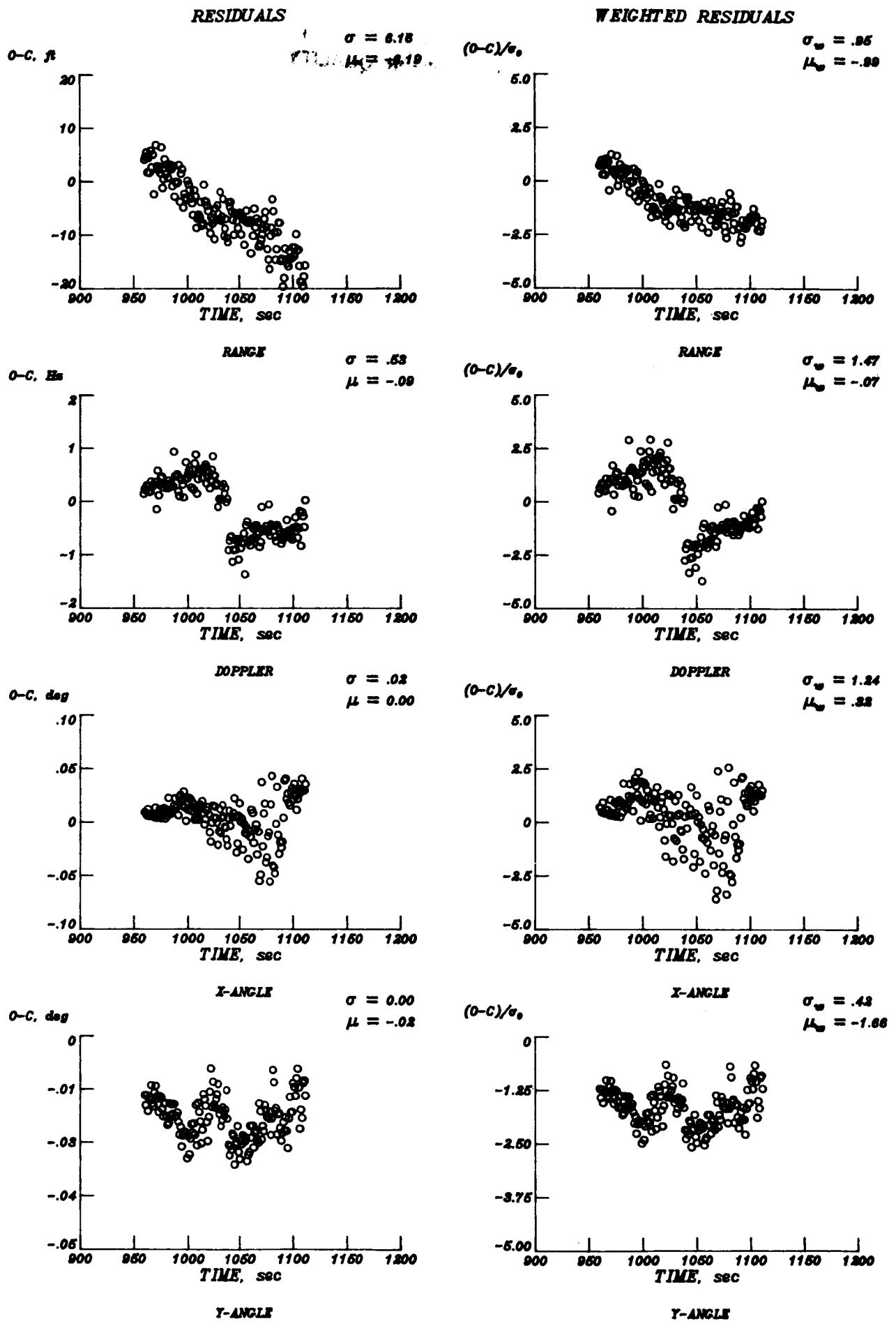


Fig. B-3. Smoothed residuals versus time for HAWS.

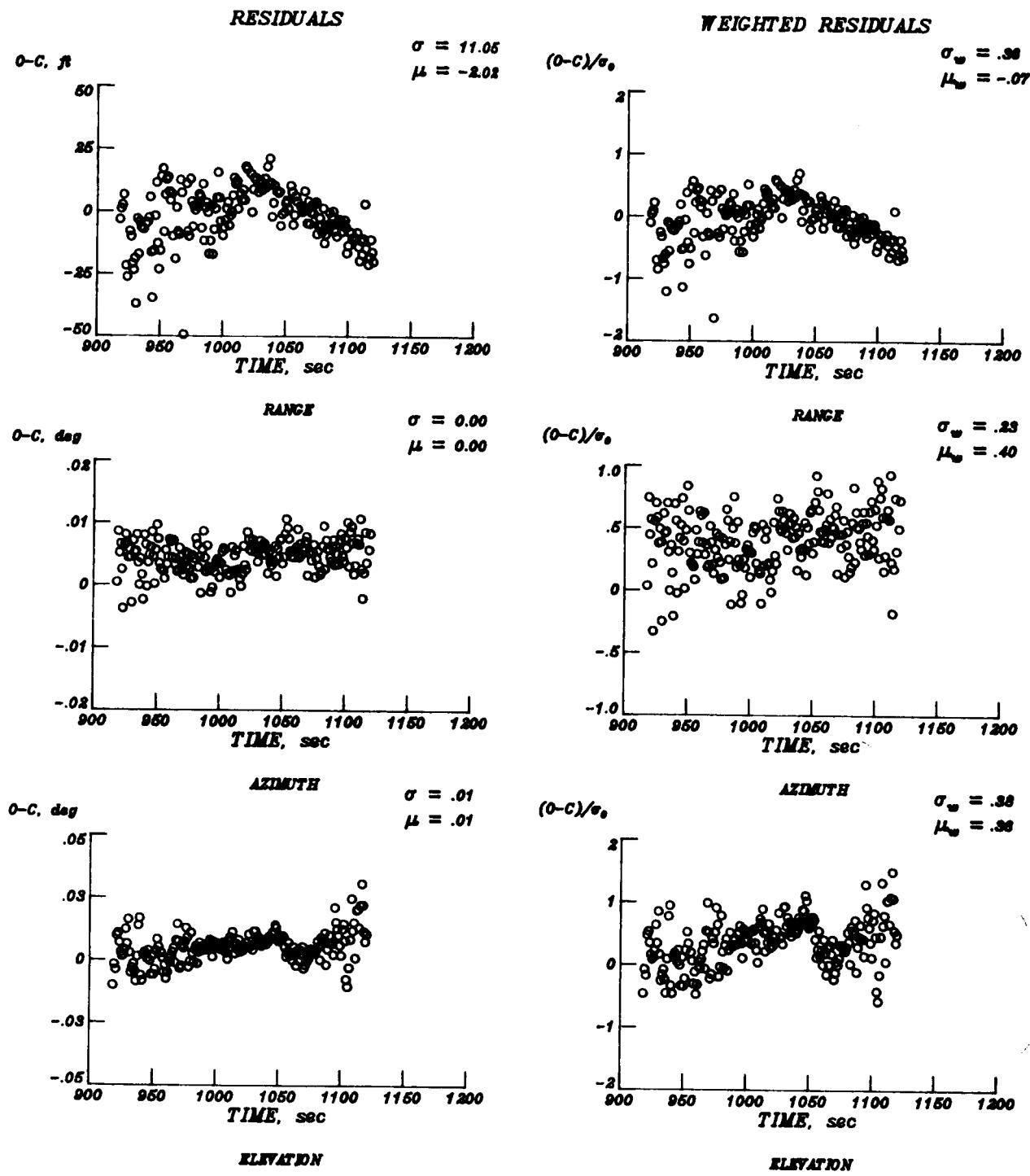


Fig. B-4. Smoothed residuals versus time for KPTC.

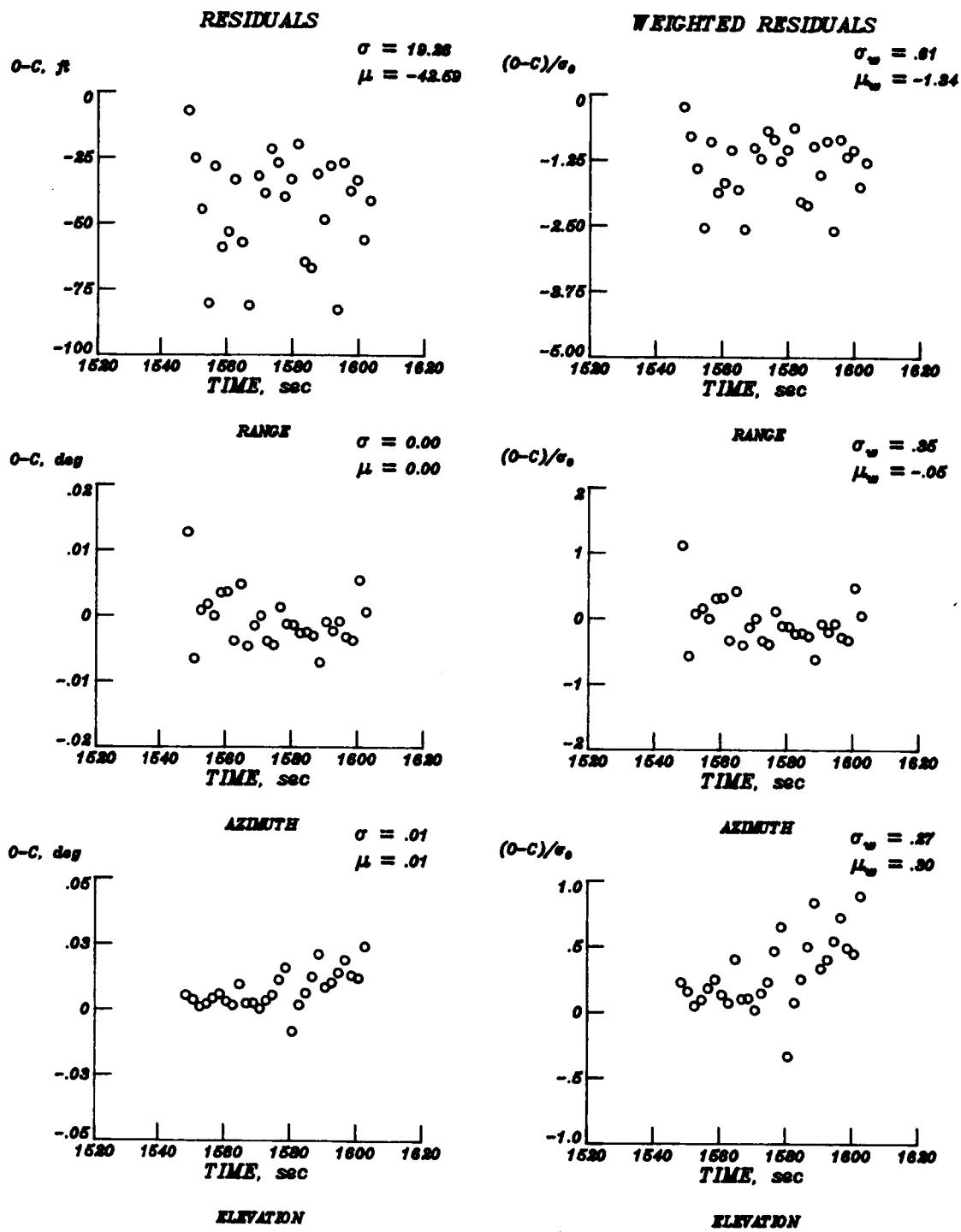


Fig. B-5. Smoothed residuals versus time for VDBC.

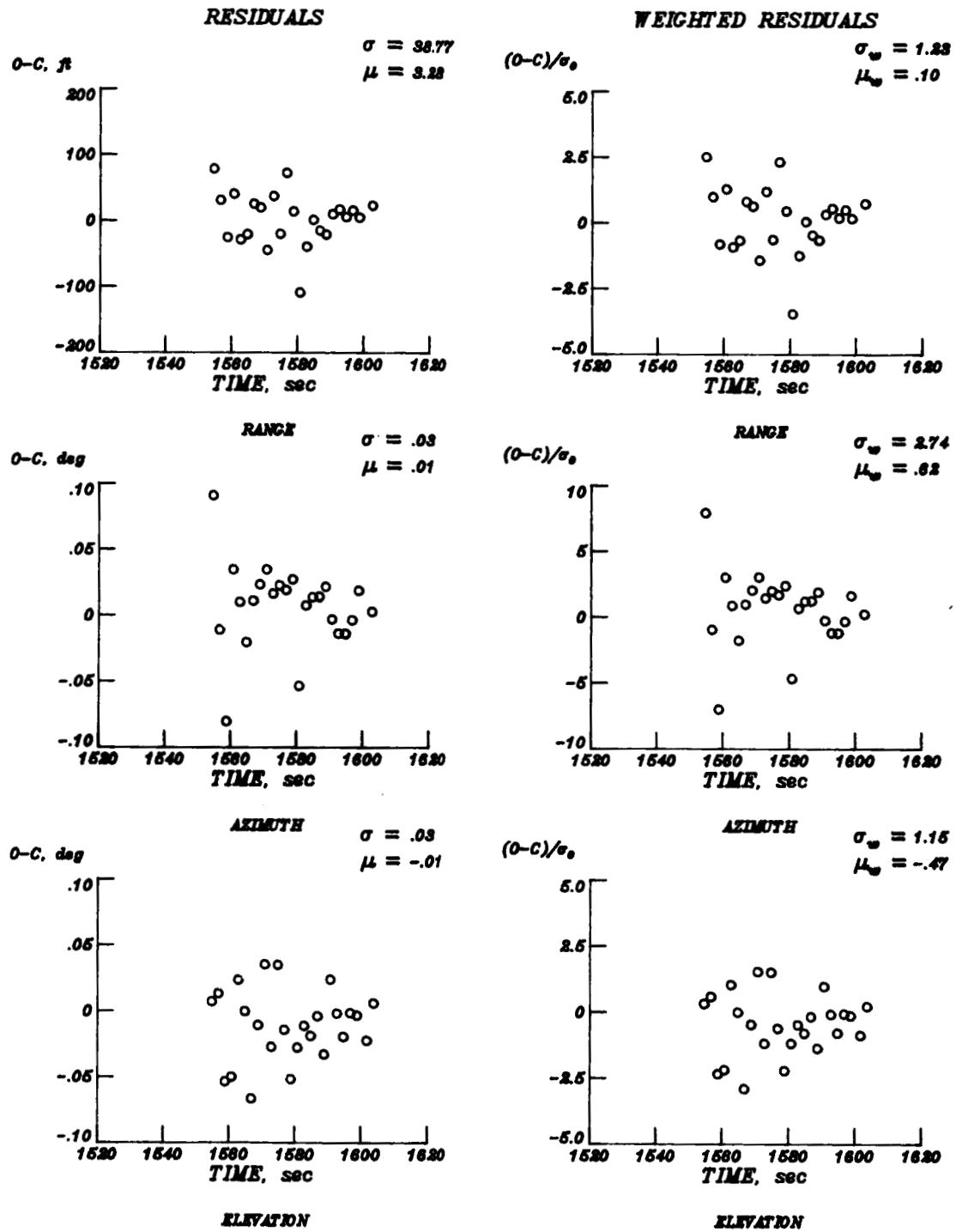


Fig. B-6. Smoothed residuals versus time for VDSC.

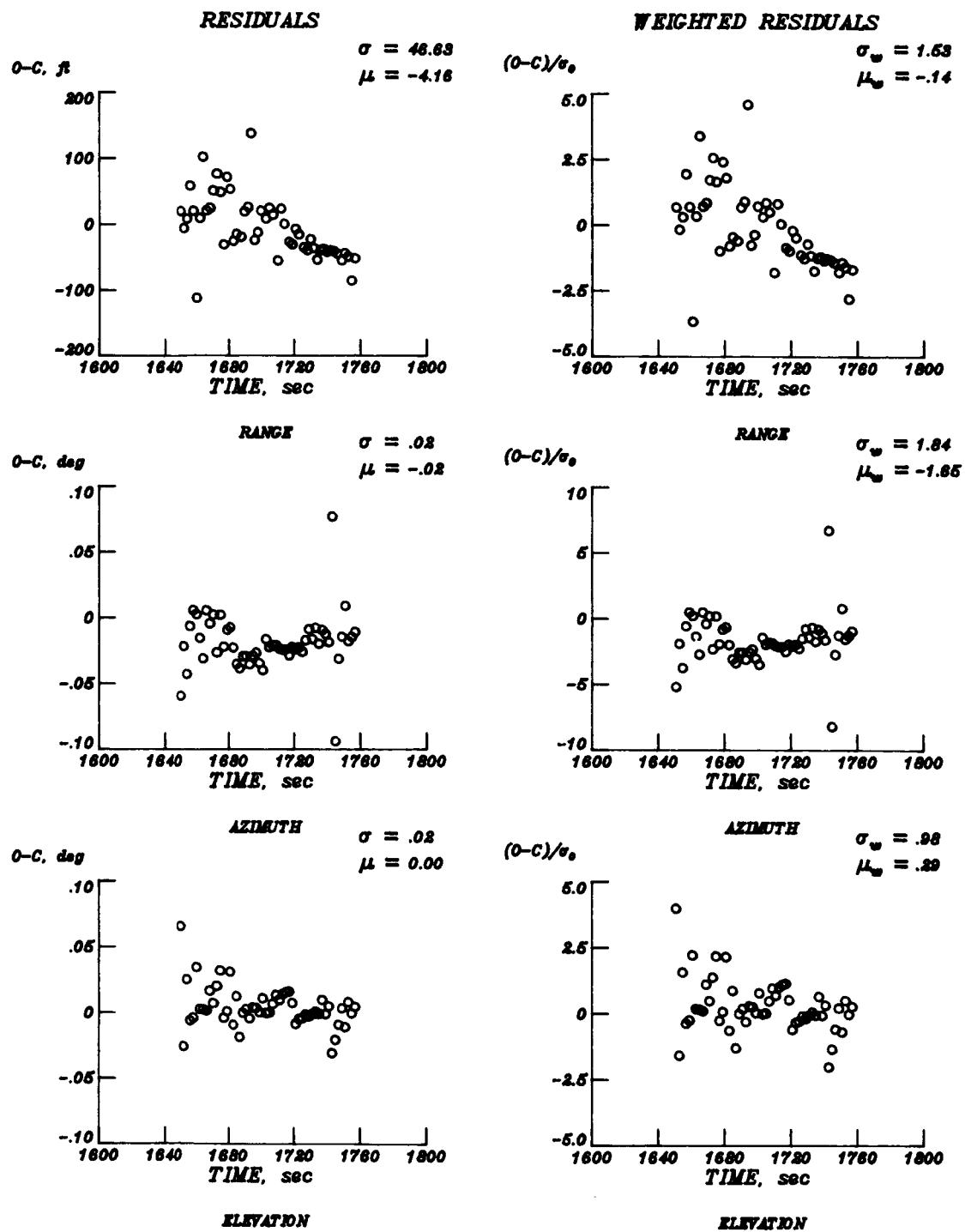


Fig. B-7. Smoothed residuals versus time for MTLC.

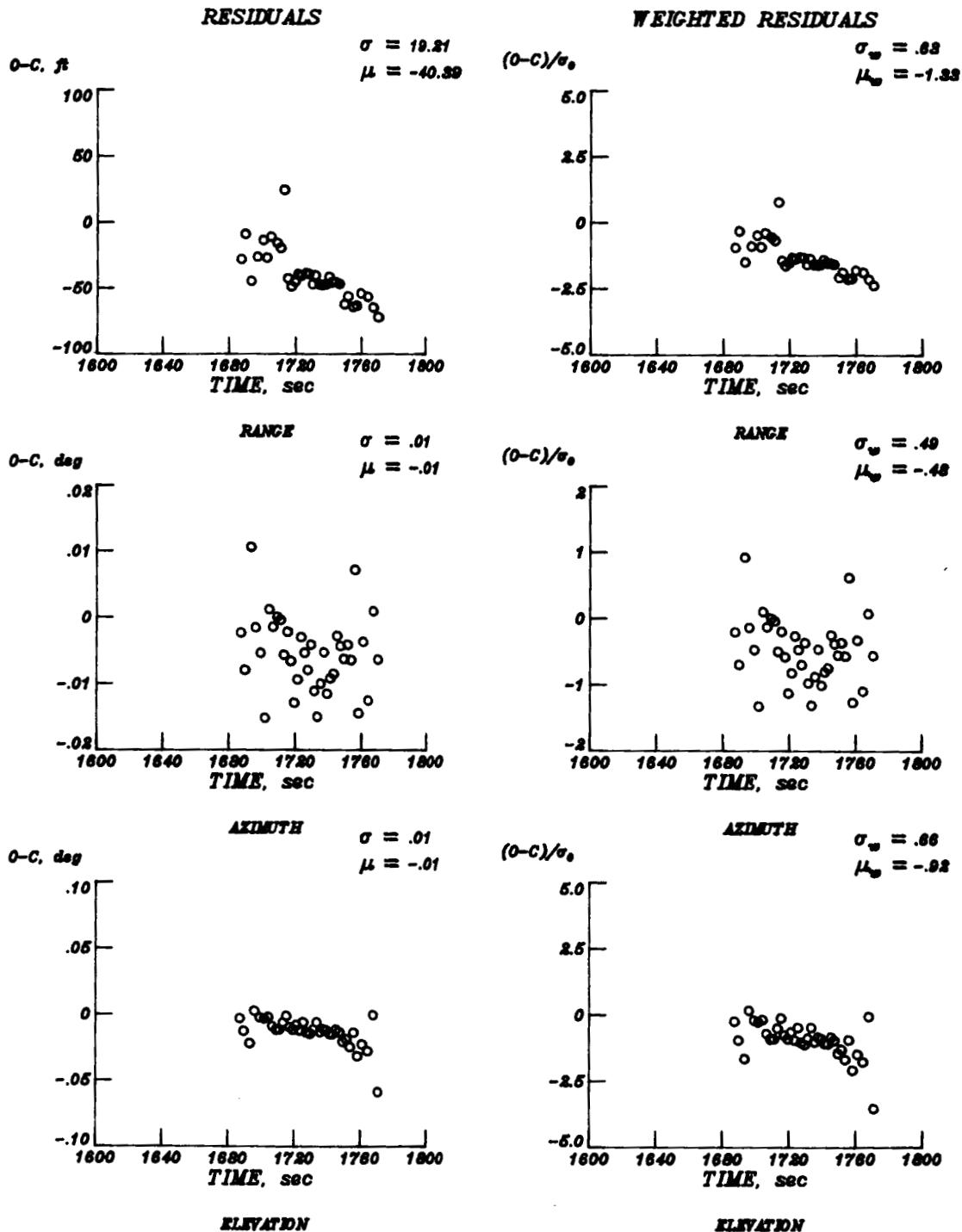


Fig. B-8. Smoothed residuals versus time for SPKC.

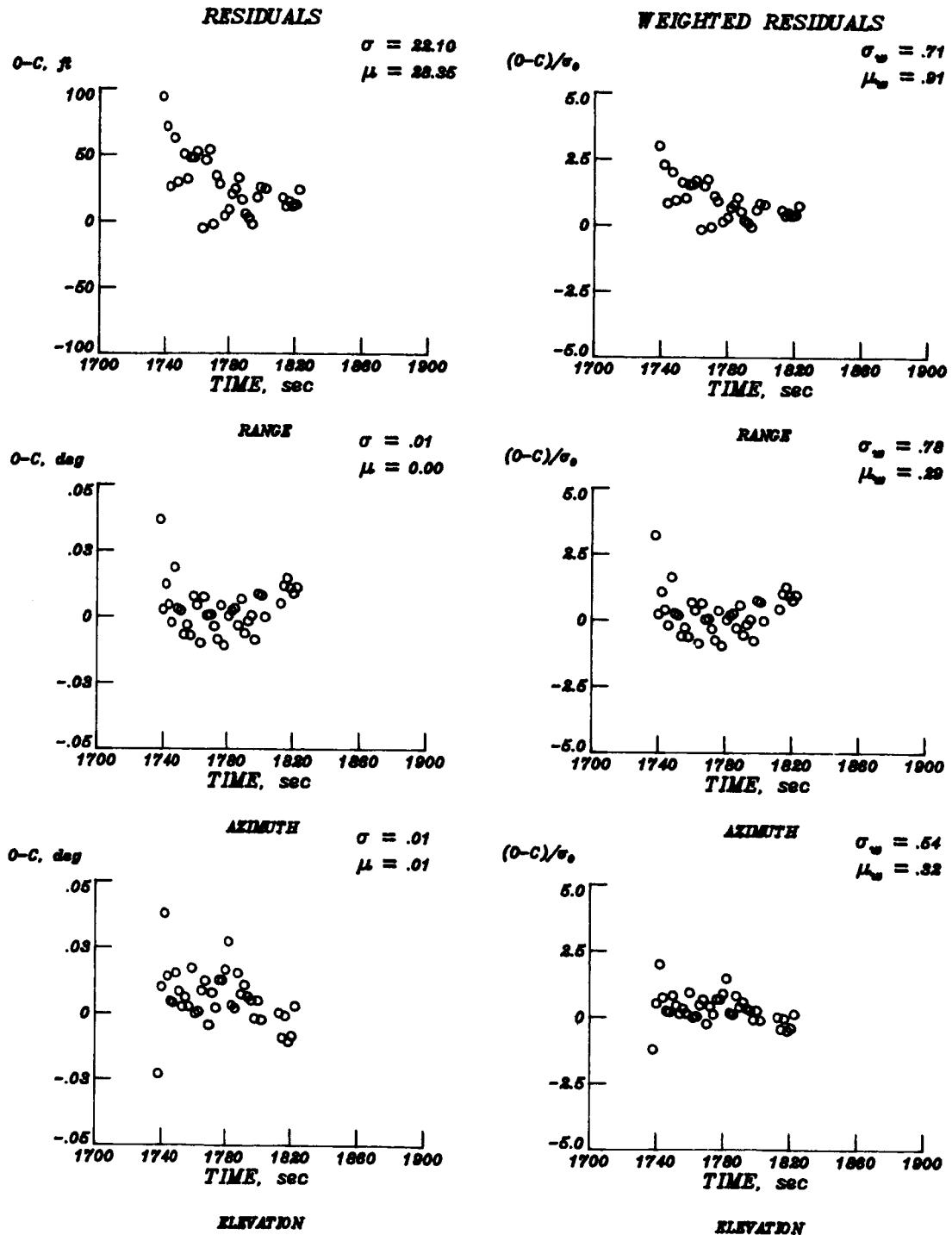


Fig. B-9. Smoothed residuals versus time for WSSC.

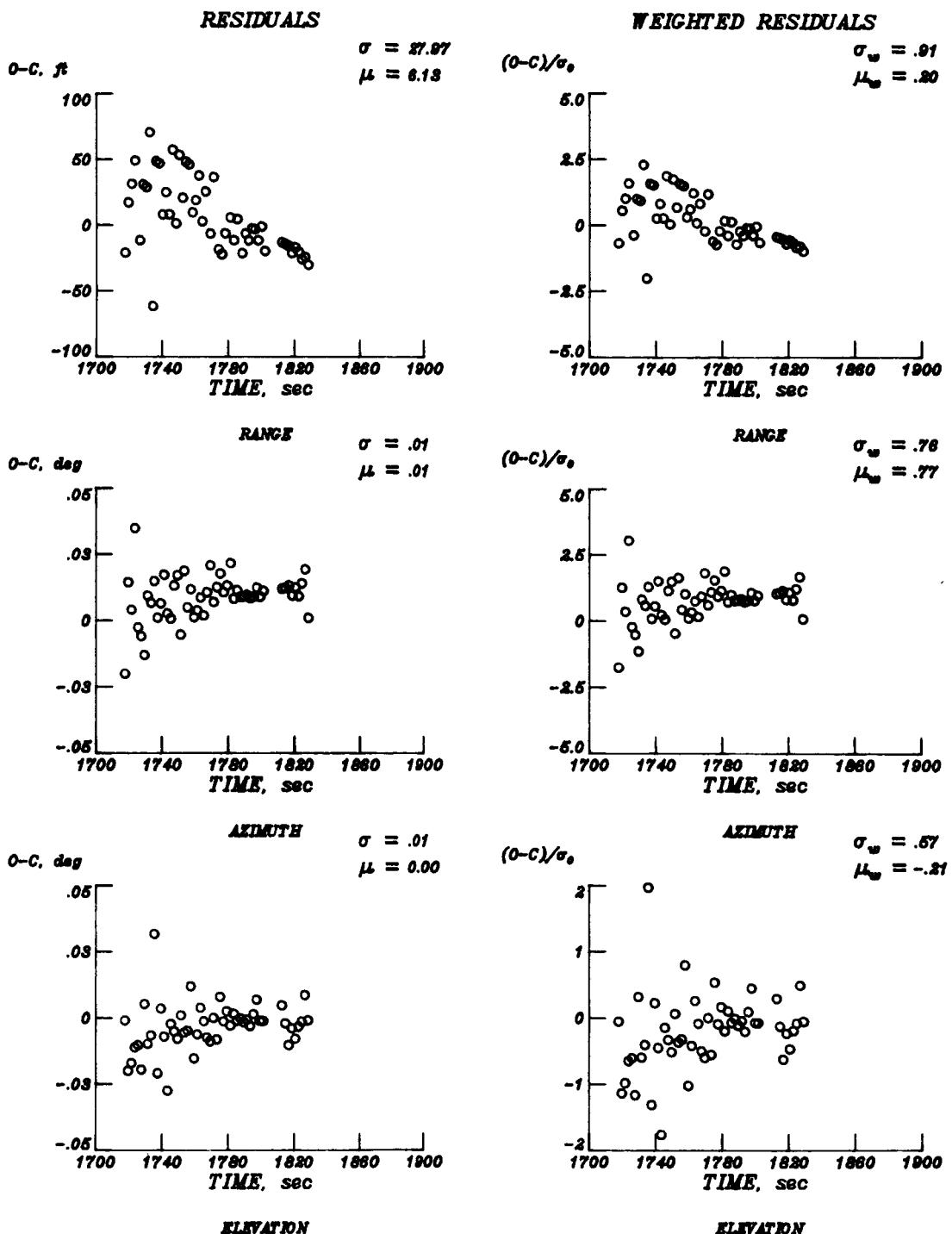


Fig. B-10. Smoothed residuals versus time for WHSC.

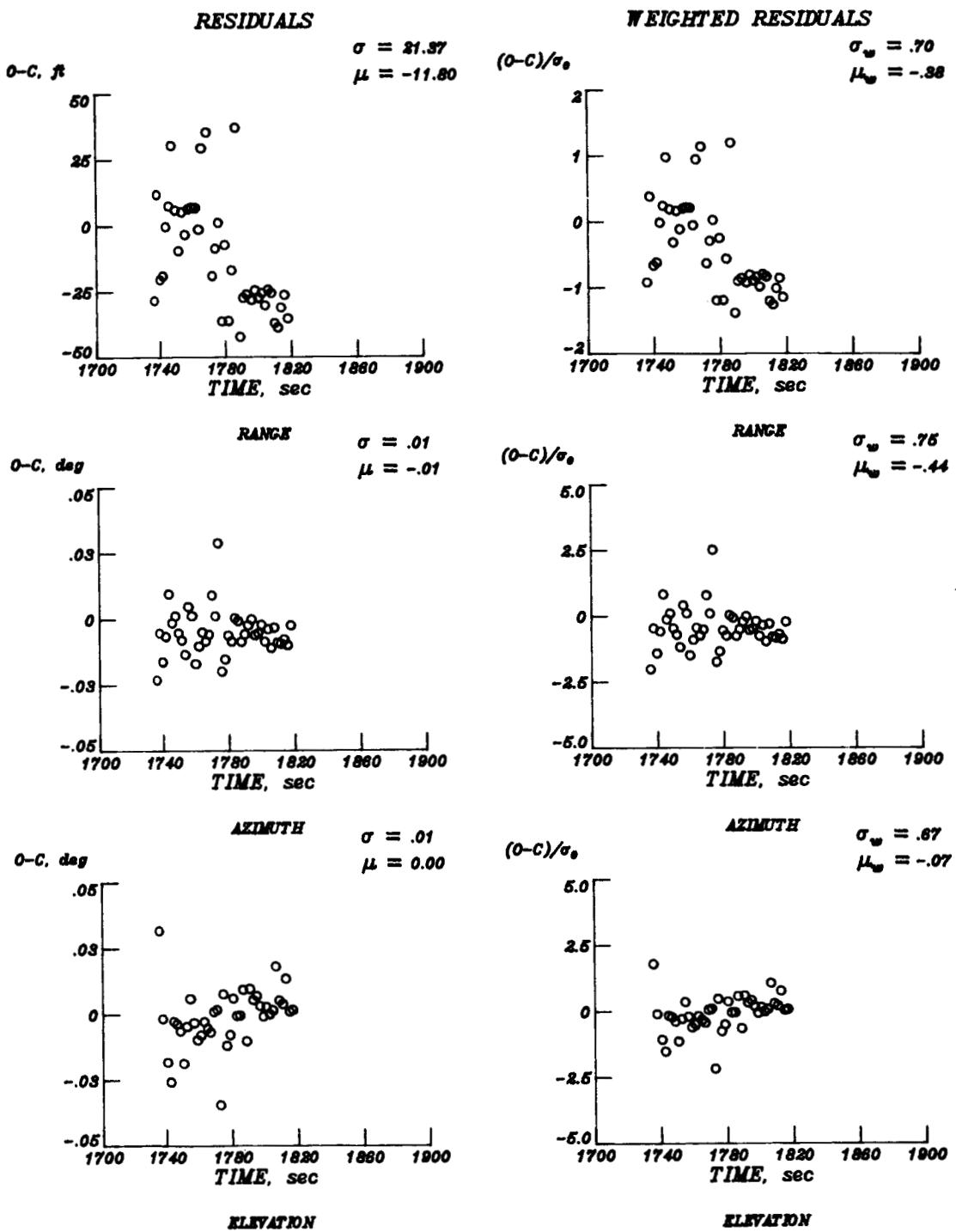


Fig. B-11. Smoothed residuals versus time for HOLEC.

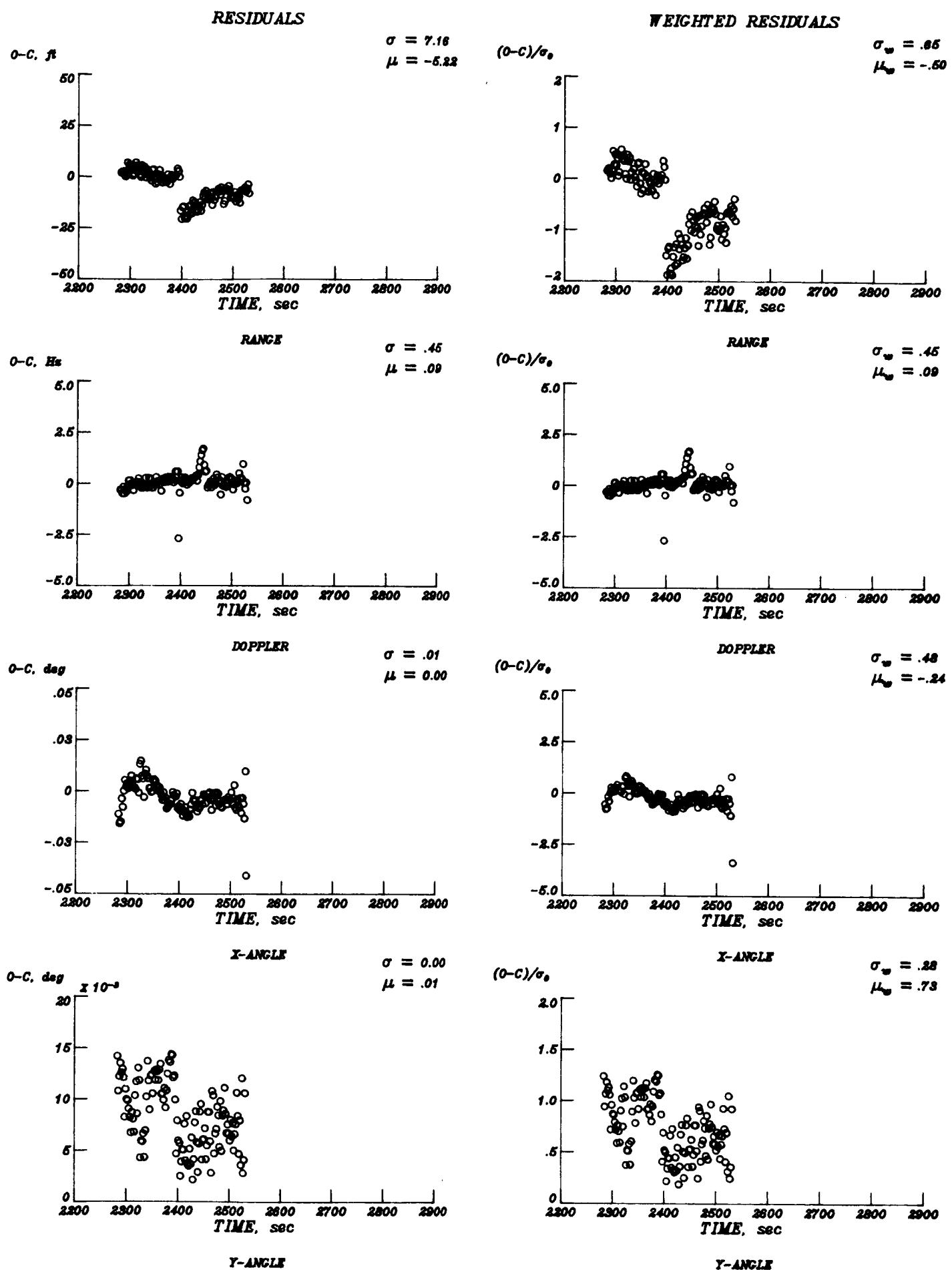


Fig. B-12. Smoothed residuals versus time for MILS.

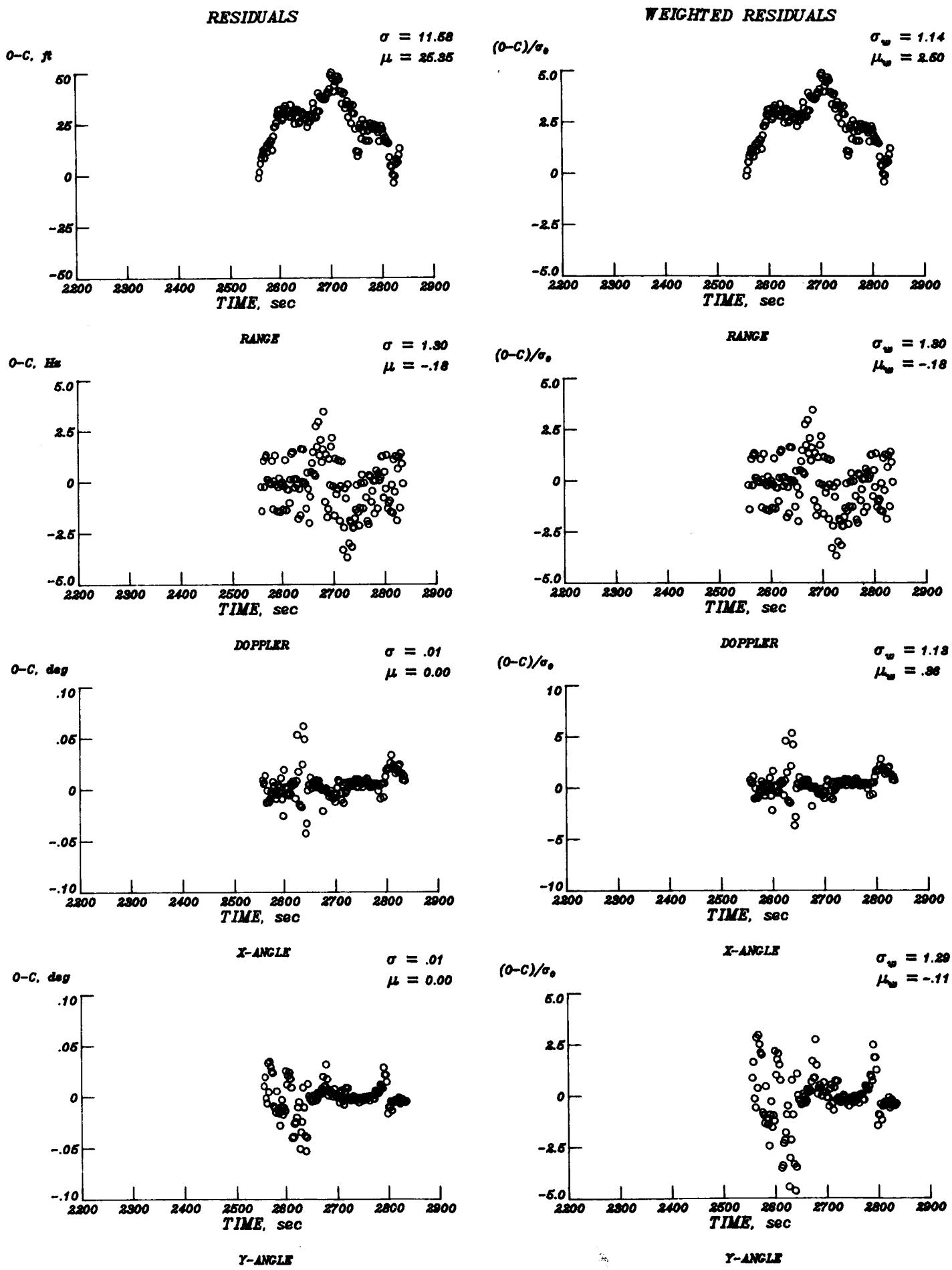


Fig. B-13. Smoothed residuals versus time for MLXS.

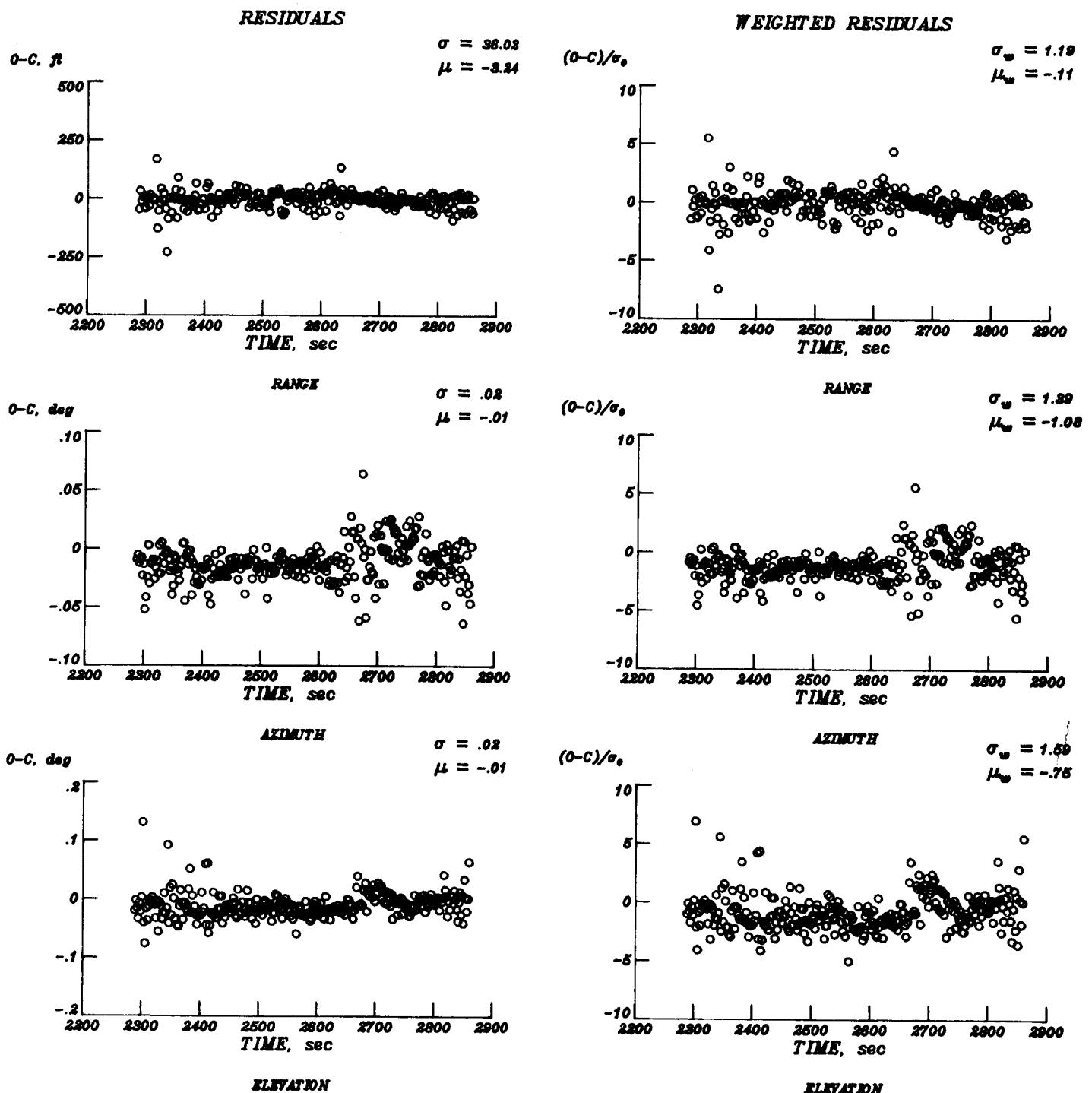


Fig. B-14. Smoothed residuals versus time for MLMC.

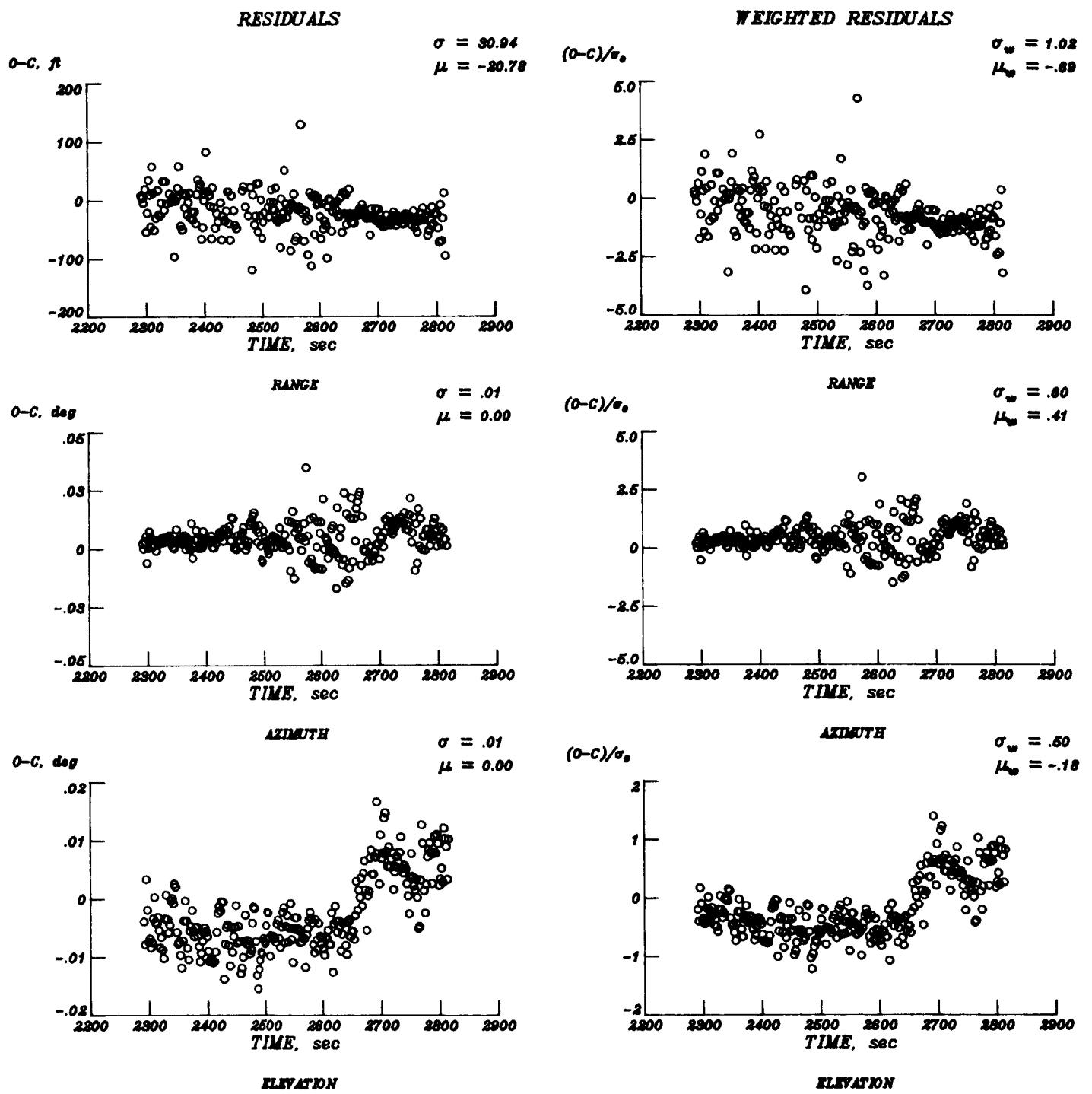


Fig. B-15. Smoothed residuals versus time for MLAC.

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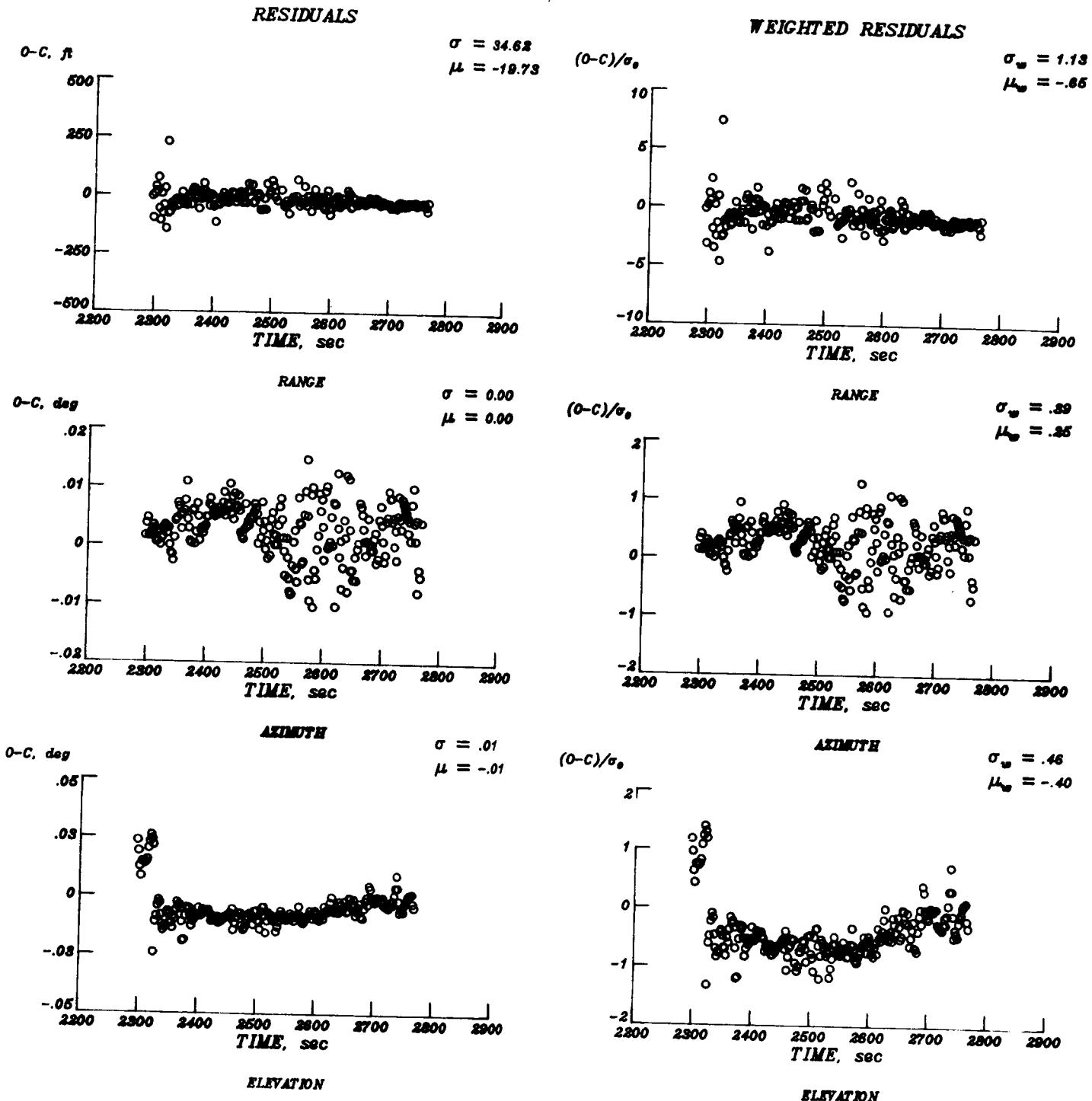


Fig. B-16. Smoothed residuals versus time for PATC.

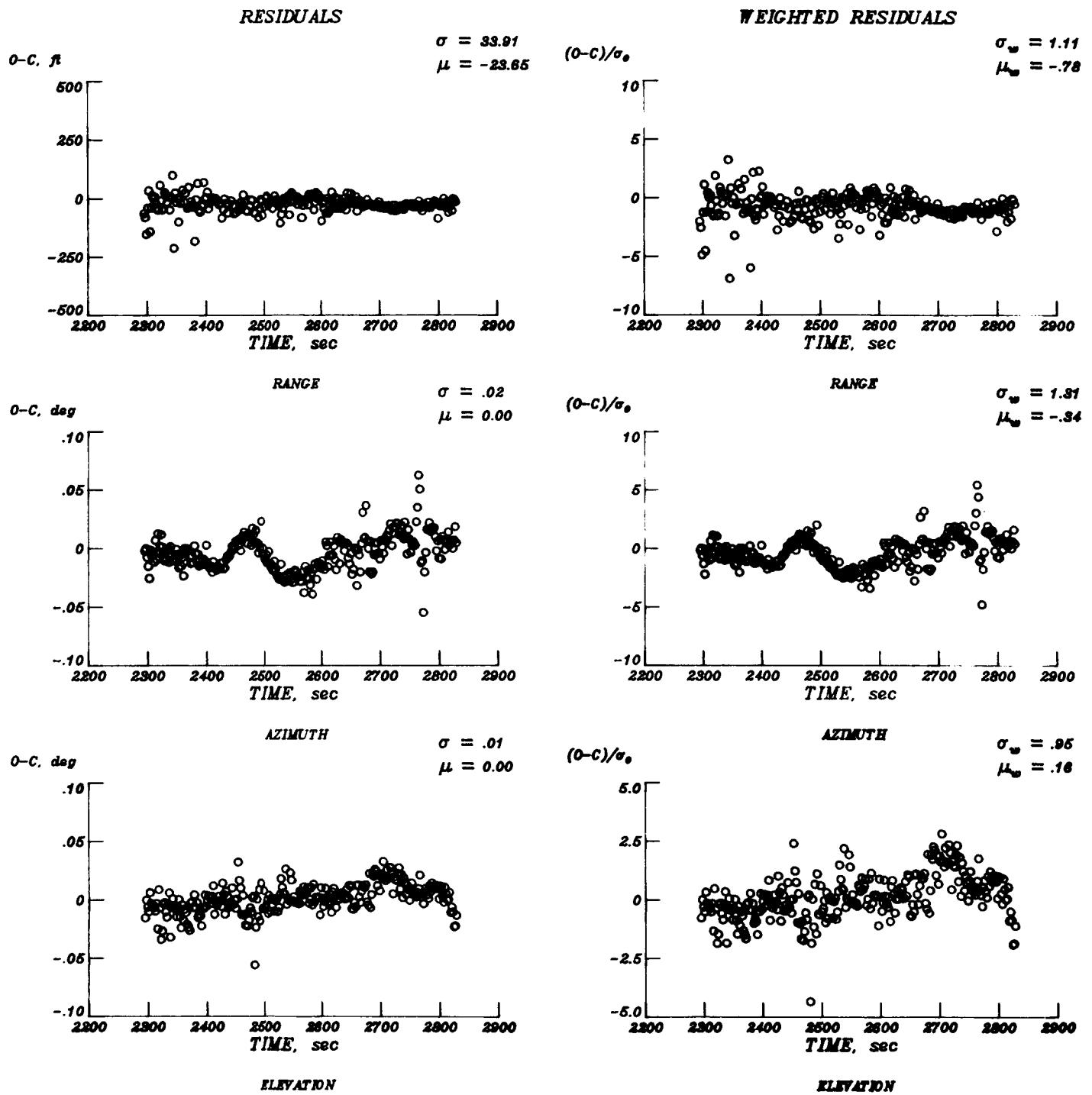


Fig. B-17. Smoothed residuals versus time for CNMC.

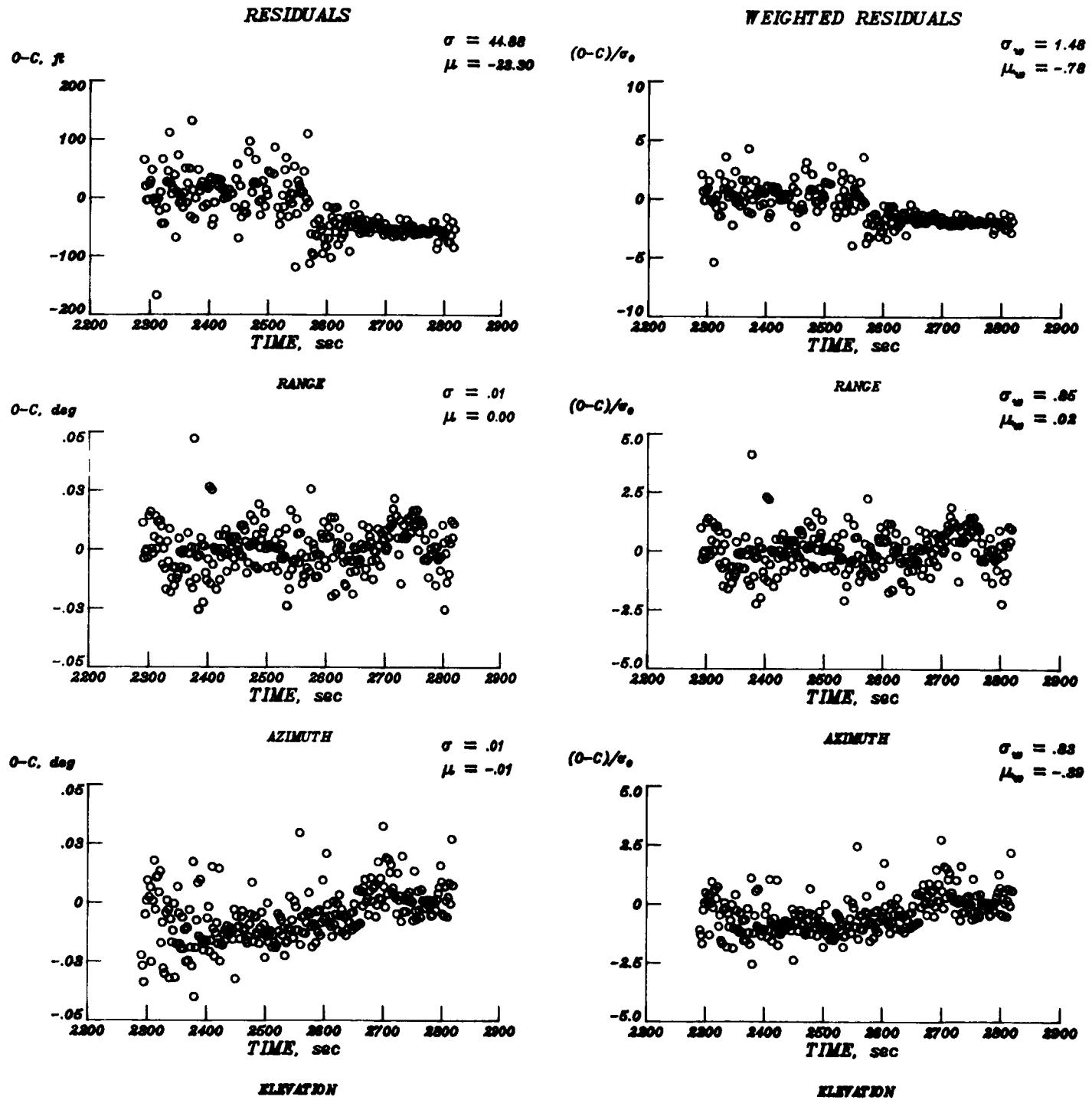
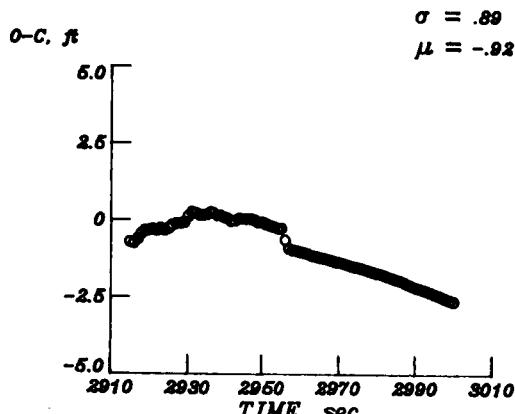
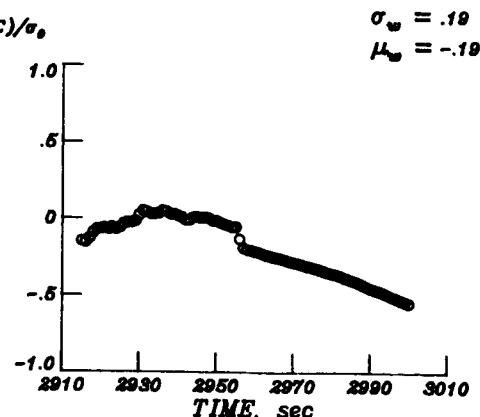


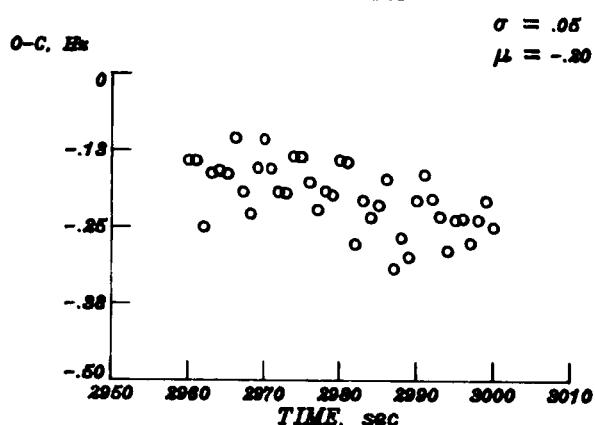
Fig. B-18. Smoothed residuals versus time for CNVC.

RESIDUALS

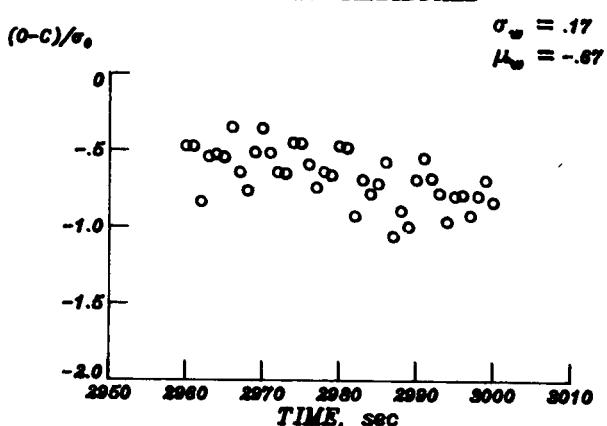
ALTIMETER

WEIGHTED RESIDUALS

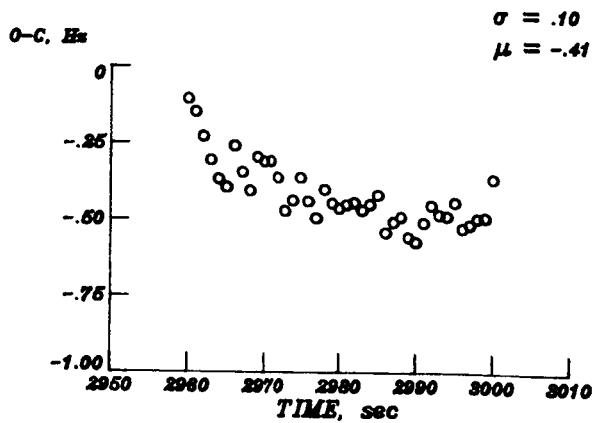
ALTIMETER

RESIDUALS

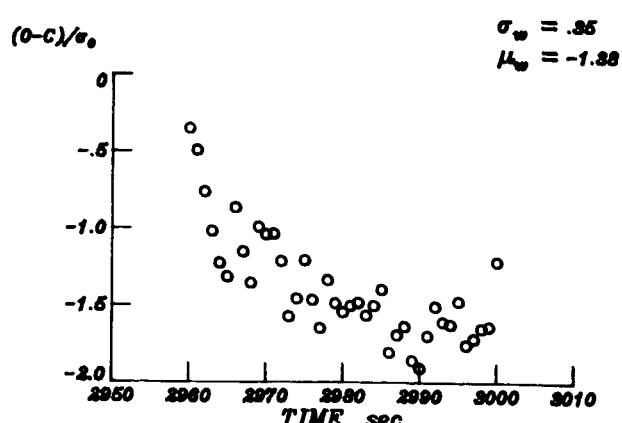
DOPPLER (Vertical)

WEIGHTED RESIDUALS

DOPPLER (Vertical)



DOPPLER (North)



DOPPLER (North)

Fig. B-19. Smoothed residuals for altimeter and Doppler (pseudo data).

APPENDIX C

Listing of trajectory and air relative parameters
from final STS-19 (51-A) Extended BET
at two(2) second intervals

••• DESCRIPTIVE DATA (48-WORDS)
••• ST19RET USING FLAIR13, INERTIAL-BT19D19, NFO264 DYN. DATA.
••• 841116 3001 STS-19 INERTIAL BET /BT19D19/ (TREF=40300)
INITIAL CONDITIONS FROM ARHQHZ (ESOLVE) 12-18-84
IMU NBR 2 EA SEQ 1 (TAPE NTO 662)
S, C-BAND, PSEUDO ALTIMETER (POST WONG), PSEUDO DOPPLER (POST STO
SOLUTION SET-STATE, ACCELEROMETER SCALE FACTORS

••• LABELS AND UNITS FOR DATA ITEMS

(1)	TIME	SEC	FT/SEC	VEL A	(3)	GAM A
(4)	HDG 4	DEG	FEET	ALTDE	(6)	LATD
(7)	LJNS	DEG	DEG	SIGMAA	(9)	BETA A
(10)	ALPHAA	DEG	DEG	YAW E	(12)	PTCH F
(13)	KJLL E	DEG	FT/SEC	FT/SEC	(15)	FT/SEC
(16)	W	FT/SEC	DEG	VEL R	(18)	GAM R
(19)	HDG R	DLG	DEG	SIGMAR	(21)	BETTA R
(22)	ALPHAR	DEG	FT/SEC	U-WIND	(24)	V-WIND
(25)	W-WIND	FT/SEC	FT/SEC	SIG-VA	(27)	SIG-GA
(28)	SIG-HA	DEG	FEET	SIG-H	(30)	SIG-LA
(31)	SIG-LO	DEG	DEG	SIG-SA	(33)	SIG-BA
(34)	SIG-AA	DEG	FT/SEC	SIG-YE	(36)	SIG-PE
(37)	SIG-RE	DEG	NONE	SIG-U	(39)	SIG-V
(40)	SIG-W	FT/SEC	MACH A	MACH R	(42)	MACH R
(43)	PINF	PSF	DEG RANKIN	RHD	(45)	SLUGS/F
(46)	Q A	PSF	DEG RANKIN	PSTAG	(48)	PSF
(49)	P	DEG/SEC	PSF	DEG/SEC	(51)	DEG/SEC
(52)	X ACCEL	FT/SEC/SEC	FT/S C/SEC	Z ACCEL	(54)	FT/SEC
(55)	CXB	NONE	NONE	Y ACCEL	(56)	FT/SEC
(58)	CL	NONE	NONE	CYB	(57)	CZB
(61)	CL-ROLL	NONE	NONE	CD	(60)	LTD
(64)	POOT	DEG/SEC 2	CM-PITCH	CN-YAW	(63)	DEG/SEC
			QDT	RDOT	(66)	DEG/SEC

•••NUMERICAL DATA
ISERNO 1 NWDS 40300
EPOCH

• 200925741F+08 RADP

• 200855591E+08 - OMEGA - .72921151E-04

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* ST19RET USING FLAIR19, INERTIAL-BT14D19, NR0264 DYN. DATA.

PAGE 1 *

TIME (SEC)	ALT DE (FT)	VELA (FPS)	GAMA (DEG)	HDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	OA (PSF)
0.0	1044473.3	23705.0	-1.188	60.107	.423	4.814	-69.822	11.537	.000
2.0	1043476.4	23706.2	-1.190	60.096	.384	4.822	-69.801	11.540	.000
4.0	1042477.6	23707.4	-1.193	60.086	.348	4.827	-69.853	11.542	.000
6.0	1041476.8	23708.6	-1.195	60.075	.316	4.830	-69.982	11.544	.000
8.0	1040474.0	23709.8	-1.198	60.065	.287	4.831	-70.185	11.547	.000
10.0	1039469.4	23711.0	-1.200	60.055	.254	4.863	-70.454	11.549	.000
12.0	1038462.6	23712.2	-1.203	60.045	.229	4.868	-70.799	11.552	.000
14.0	1037454.3	23713.4	-1.205	60.035	.210	4.867	-71.222	11.554	.000
16.0	1036443.8	23714.7	-1.207	60.025	.190	4.877	-71.706	11.556	.000
18.0	1035431.5	23715.9	-1.210	60.016	.177	4.871	-72.275	11.559	.000
20.0	1034417.3	23717.1	-1.212	60.006	.163	4.877	-72.924	11.561	.000
22.0	1033401.2	23718.3	-1.215	59.997	.149	4.888	-73.639	11.564	.000
24.0	1032333.1	23719.6	-1.217	59.988	.142	4.879	-74.432	11.566	.000
26.0	1031363.2	23720.6	-1.220	59.979	.137	4.887	-74.754	11.569	.000
28.0	1030341.2	23721.8	-1.222	59.970	.133	4.887	-74.743	11.571	.000
30.0	1029317.5	23723.0	-1.225	59.961	.130	4.888	-74.725	11.573	.000
32.0	1028291.6	23724.3	-1.227	59.952	.131	4.874	-74.679	11.576	.000
34.0	1027264.2	23725.5	-1.229	59.944	.139	4.877	-74.637	11.578	.000
36.0	1026234.8	23726.6	-1.232	59.936	.145	4.867	-74.494	11.581	.000
38.0	1025203.4	23727.9	-1.234	59.927	.153	4.870	-74.235	11.583	.000
40.0	1024170.2	23729.1	-1.236	59.919	.170	4.863	-74.047	11.586	.000
42.0	1023135.2	23730.4	-1.239	59.911	.188	4.852	-73.929	11.588	.000
44.0	1022098.3	23731.7	-1.241	59.903	.211	4.838	-73.896	11.591	.000
46.0	1021059.6	23732.9	-1.244	59.896	.227	4.828	-73.900	11.593	.000
48.0	1020019.0	23734.1	-1.246	59.888	.249	4.822	-73.582	11.596	.000
50.0	1018976.6	23735.3	-1.248	59.881	.276	4.825	-73.337	11.598	.000
52.0	1017932.3	23736.6	-1.251	59.874	.301	4.810	-73.153	11.601	.000
54.0	1016880.3	23737.8	-1.253	59.866	.333	4.803	-73.052	11.603	.000
56.0	1015835.4	23739.1	-1.255	59.859	.368	4.797	-73.027	11.606	.000
58.0	1014788.6	23740.4	-1.258	59.853	.400	4.781	-73.060	11.608	.000

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***** ST19BET USING FLAIR19, INERTIAL-BT19019, NPG264 DYN. DATA. *****
 ***** PAGE 2 *****

TIME (SEC)	ALTDE (FT)	VELA (FPS)	GAMA (DEG)	HOGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	OA (PSF)
60.0	1013737.1	23741.7	-1.260	59.846	4.44	4.779	-72.866	11.611	.000
62.0	1012683.6	23743.0	-1.262	59.839	4.76	4.780	-72.522	11.614	.000
64.0	1011626.4	23744.3	-1.265	59.833	5.13	4.780	-72.189	11.616	.000
66.0	1010571.3	23745.6	-1.267	59.826	5.15	4.791	-71.835	11.619	.000
68.0	1009512.4	23746.9	-1.269	59.820	4.50	4.802	-71.480	11.621	.000
70.0	1008451.6	23748.2	-1.272	59.814	3.80	4.829	-71.125	11.624	.000
72.0	1007386.4	23749.5	-1.274	59.806	3.18	4.856	-70.765	11.626	.000
74.0	1006324.5	23750.8	-1.276	59.802	2.46	4.888	-70.396	11.629	.000
76.0	1005258.3	23752.1	-1.279	59.797	1.75	4.917	-70.026	11.632	.000
78.0	1004190.3	23753.4	-1.281	59.791	1.16	4.945	-69.656	11.634	.000
80.0	1003120.5	23754.7	-1.283	59.786	0.50	4.982	-69.268	11.637	.000
82.0	1002045.9	23756.1	-1.286	59.781	-0.23	5.021	-68.891	11.640	.000
84.0	1000975.4	23757.4	-1.288	59.776	-0.91	5.058	-68.510	11.642	.000
86.0	999900.2	23758.7	-1.290	59.771	-1.54	5.099	-68.123	11.645	.000
88.0	998823.3	23760.0	-1.292	59.766	-2.18	5.137	-67.738	11.648	.000
90.0	997744.5	23761.3	-1.295	59.761	-2.90	5.180	-67.344	11.650	.000
92.0	996664.0	23762.7	-1.297	59.756	-3.50	5.224	-66.949	11.653	.000
94.0	995531.7	23764.0	-1.299	59.752	-4.17	5.272	-66.549	11.656	.000
96.0	994497.7	23765.4	-1.301	59.748	-4.88	5.323	-66.145	11.658	.000
98.0	993411.9	23766.7	-1.304	59.744	-5.62	5.373	-65.748	11.661	.000
100.0	992324.4	23768.0	-1.306	59.740	-6.33	5.435	-65.347	11.664	.000
102.0	991235.1	23769.3	-1.308	59.736	-7.03	5.499	-64.932	11.666	.000
104.0	990144.1	23770.7	-1.310	59.732	-7.76	5.570	-64.523	11.669	.000
106.0	989051.4	23772.0	-1.313	59.728	-7.97	5.537	-64.097	11.672	.000
108.0	987956.9	23773.4	-1.315	59.725	-7.93	5.473	-63.671	11.674	.000
110.0	986860.7	23774.7	-1.317	59.722	-7.95	5.409	-63.242	11.677	.000
112.0	985762.8	23776.1	-1.319	59.718	-7.91	5.350	-62.806	11.680	.000
114.0	984603.2	23777.4	-1.321	59.715	-7.87	5.300	-62.367	11.683	.000
116.0	983551.9	23778.8	-1.323	59.712	-7.77	5.241	-61.932	11.685	.000
118.0	982458.9	23780.2	-1.326	59.710	-7.76	5.190	-61.489	11.688	.000

** 119821 USING FLA129, INERTIAL-BT19D19, NPO264 DYN. DATA. PAGE - 3 -

TIME (SEC)	ALTITUDE (FT)	VELA (FPS)	GAMA (DEG)	SIGMA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	OA (PSF)	TPSF1
120.0	981354.2	23781.5	-1.328	59.707	-0.766	5.134	-61.168	11.691	000
122.0	980247.9	23782.9	-1.330	59.705	-0.754	5.084	-60.974	11.694	000
124.0	979139.8	23784.2	-1.332	59.702	-0.748	5.048	-60.867	11.697	000
126.0	978030.4	23785.6	-1.334	59.700	-0.731	4.999	-60.792	11.699	000
128.0	976918.7	23787.0	-1.336	59.698	-0.724	4.961	-60.720	11.702	000
130.0	975805.6	23788.4	-1.338	59.696	-0.716	4.937	-60.639	11.705	000
132.0	974690.9	23789.7	-1.341	59.694	-0.701	4.903	-60.557	11.708	000
134.0	973574.6	23791.1	-1.343	59.692	-0.696	4.868	-60.475	11.711	000
136.0	972456.6	23792.5	-1.345	59.691	-0.685	4.841	-60.380	11.714	000
138.0	971337.0	23793.9	-1.347	59.689	-0.681	4.825	-60.293	11.716	000
140.0	970215.7	23795.2	-1.349	59.688	-0.688	4.801	-60.196	11.719	000
142.0	969092.8	23796.6	-1.351	59.687	-0.680	4.790	-60.099	11.722	000
144.0	967908.3	23798.0	-1.353	59.686	-0.649	4.767	-59.992	11.725	000
146.0	966842.1	23799.4	-1.355	59.685	-0.639	4.760	-59.891	11.728	000
148.0	965714.4	23800.8	-1.357	59.684	-0.630	4.754	-59.784	11.731	000
150.0	964585.1	23802.2	-1.359	59.683	-0.621	4.745	-59.668	11.734	000
152.0	963454.1	23803.6	-1.361	59.683	-0.610	4.742	-59.558	11.737	000
154.0	962321.6	23804.9	-1.363	59.683	-0.603	4.740	-59.439	11.739	000
156.0	961187.5	23806.4	-1.365	59.683	-0.595	4.740	-59.319	11.742	000
158.0	960051.8	23807.7	-1.367	59.683	-0.582	4.741	-59.197	11.745	000
160.0	958914.6	23809.1	-1.369	59.683	-0.571	4.754	-59.059	11.748	000
162.0	957775.7	23810.5	-1.371	59.683	-0.567	4.774	-58.937	11.751	000
164.0	956935.3	23812.0	-1.373	59.684	-0.553	4.774	-58.819	11.754	000
166.0	955493.4	23813.3	-1.375	59.684	-0.549	4.768	-58.757	11.757	000
168.0	954349.9	23814.8	-1.377	59.685	-0.539	4.821	-58.522	11.760	000
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***** ST19BET USING FLAIR19, INERTIAL-BT19019, NPO264 DYN. DATA.

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TIME (SEC)	ALTITUDE (FT)	VELA (FPS)	GAMA (DEG)	HOGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PPSF)
1.80.0	947456.6	23823.3	-1.389	59.692	-0.480	5.001	-57.623	11.778	.000
1.82.0	946302.6	23824.7	-1.391	59.693	-0.481	5.045	-57.464	11.781	.000
1.84.0	945146.9	23826.1	-1.393	59.695	-0.492	5.094	-57.301	11.784	.000
1.86.0	943989.7	23827.5	-1.395	59.697	-0.542	5.156	-57.127	11.787	.000
1.88.0	942631.1	23829.0	-1.397	59.699	-0.601	5.229	-56.947	11.790	.000
1.90.0	941670.9	23830.4	-1.399	59.701	-0.646	5.293	-56.769	11.794	.000
1.92.0	940509.3	23831.8	-1.401	59.703	-0.700	5.366	-56.586	11.797	.000
1.94.0	939346.2	23833.2	-1.402	59.706	-0.757	5.444	-56.401	11.800	.000
1.96.0	938181.7	23834.7	-1.404	59.708	-0.810	5.518	-56.227	11.803	.000
1.98.0	937015.7	23836.1	-1.406	59.711	-0.865	5.597	-56.098	11.806	.000
2.00.0	935840.2	23837.6	-1.408	59.714	-0.921	5.683	-55.962	11.809	.000
2.02.0	934679.3	23839.0	-1.410	59.717	-0.972	5.769	-55.825	11.812	.000
2.04.0	933509.0	23840.5	-1.412	59.720	-1.064	5.852	-55.679	11.815	.000
2.06.0	932337.2	23841.9	-1.414	59.723	-1.096	5.849	-55.527	11.819	.000
2.08.0	931164.0	23843.3	-1.415	59.727	-1.124	5.842	-55.370	11.822	.000
2.10.0	929989.4	23844.8	-1.417	59.730	-1.153	5.845	-55.212	11.825	.000
2.12.0	928813.3	23846.2	-1.419	59.734	-1.179	5.843	-55.047	11.828	.000
2.14.0	927635.8	23847.7	-1.421	59.738	-1.206	5.855	-54.907	11.831	.000
2.16.0	926456.9	23849.2	-1.423	59.742	-1.237	5.859	-54.800	11.835	.000
2.18.0	925276.7	23850.6	-1.425	59.746	-1.263	5.865	-54.660	11.838	.000
2.20.0	924095.0	23852.1	-1.426	59.750	-1.219	5.789	-54.558	11.841	.000
2.22.0	922911.9	23853.5	-1.428	59.755	-1.159	5.688	-54.440	11.844	.000
2.24.0	921727.4	23855.0	-1.430	59.759	-1.102	5.593	-54.309	11.848	.000
2.26.0	920541.6	23856.4	-1.432	59.764	-1.037	5.501	-54.178	11.851	.000
2.28.0	919354.4	23857.9	-1.433	59.769	-0.976	5.421	-54.047	11.854	.000
2.30.0	918165.9	23859.4	-1.435	59.774	-0.913	5.325	-53.913	11.858	.000
2.32.0	916975.9	23860.8	-1.437	59.779	-0.855	5.247	-53.767	11.861	.000
2.34.0	915784.7	23862.3	-1.439	59.784	-0.797	5.175	-53.628	11.864	.000
2.36.0	914592.1	23863.8	-1.440	59.789	-0.727	5.093	-53.485	11.868	.000
2.38.0	913338.2	23865.2	-1.442	59.795	-0.675	5.020	-53.336	11.871	.000

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* ST19BET USING FLAIR19, INERTIAL-BT19D19, NP0264 DYN. DATA.
* PAGE 5

TIME (SEC)	ALTDE (FT)	VELA (FPS)	GAMA (DEG)	HDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
240.0	912202.9	238666.7	-1.444	59.801	-0.610	4.948	-53.168	11.874	.000
242.0	911030.3	23668.2	-1.445	59.806	-0.582	4.892	-53.026	11.878	.000
244.0	909805.4	23869.7	-1.447	59.812	-0.587	4.851	-52.865	11.881	.000
246.0	908605.2	23671.2	-1.449	59.818	-0.577	4.804	-52.731	11.884	.000
248.0	907406.7	23672.7	-1.451	59.824	-0.575	4.756	-52.627	11.888	.000
250.0	906206.8	23674.1	-1.452	59.831	-0.575	4.720	-52.513	11.891	.000
252.0	905003.7	23875.6	-1.454	59.837	-0.579	4.688	-52.398	11.895	.000
254.0	903799.3	23877.1	-1.456	59.844	-0.578	4.652	-52.280	11.898	.000
256.0	902593.6	23878.6	-1.457	59.851	-0.576	4.619	-52.161	11.902	.000
258.0	901386.6	23880.1	-1.459	59.858	-0.575	4.594	-52.039	11.905	.000
260.0	900173.3	23681.5	-1.461	59.865	-0.576	4.552	-51.862	11.909	.000
262.0	898468.6	23882.9	-1.462	59.872	-0.591	4.479	-50.835	11.912	.000
264.0	897757.6	23884.4	-1.464	59.879	-0.595	4.408	-49.752	11.916	.000
266.0	896545.3	23885.9	-1.466	59.887	-0.614	4.339	-48.671	11.919	.000
268.0	895331.7	23887.3	-1.467	59.894	-0.624	4.283	-47.586	11.923	.000
270.0	894116.9	23888.9	-1.469	59.902	-0.630	4.218	-46.506	11.926	.000
272.0	892930.9	23890.3	-1.470	59.910	-0.625	4.163	-45.411	11.930	.000
274.0	891683.6	23891.9	-1.472	59.918	-0.623	4.102	-44.317	11.933	.000
276.0	890465.1	23893.4	-1.474	59.926	-0.627	4.064	-43.237	11.937	.000
278.0	889245.4	23894.9	-1.475	59.934	-0.630	4.017	-42.138	11.941	.000
280.0	888024.5	23896.4	-1.477	59.943	-0.624	3.967	-41.032	11.944	.000
282.0	886802.4	23897.9	-1.478	59.951	-0.626	3.928	-39.920	11.948	.000
284.0	885579.2	23899.4	-1.480	59.960	-0.620	3.882	-38.815	11.952	.000
286.0	884354.7	23900.9	-1.481	59.969	-0.613	3.845	-37.705	11.955	.000
288.0	883129.0	23902.4	-1.483	59.978	-0.616	3.818	-36.584	11.959	.000
290.0	881902.2	23903.9	-1.484	59.987	-0.607	3.778	-35.470	11.963	.000
292.0	880674.1	23905.4	-1.486	59.996	-0.614	3.759	-34.345	11.966	.000
294.0	879444.9	23907.0	-1.487	60.006	-0.618	3.743	-33.224	11.970	.000
296.0	878214.6	23908.5	-1.489	60.015	-0.624	3.721	-32.092	11.974	.000
298.0	876983.1	23910.0	-1.490	60.025	-0.640	3.709	-30.959	11.978	.000

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 * ST19AET USING FLAIR10, INERTIAL-BT19D19, NP0264 DYN. DATA.
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TIME (SEC)	ALTUE (FT)	VELA (FPS)	GAMA (DEG)	HOGA (DEG)	SIGMA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
300.0	875750.4	23911.5	-1.492	60.035	-0.637	3.704	-29.833	11.981	.000
302.0	874516.7	23913.1	-1.493	60.045	-0.650	3.696	-28.693	11.985	.000
304.0	873231.7	23914.6	-1.495	60.055	-0.640	3.680	-27.553	11.989	.000
306.0	872042.7	23916.1	-1.496	60.065	-0.656	3.676	-26.414	11.993	.000
308.0	870806.5	23917.6	-1.498	60.076	-0.659	3.667	-25.266	11.997	.000
310.0	869570.2	23919.2	-1.499	60.086	-0.664	3.672	-24.116	12.001	.000
312.0	868330.8	23920.7	-1.500	60.097	-0.677	3.691	-22.966	12.004	.000
314.0	867090.3	23922.2	-1.502	60.108	-0.679	3.685	-21.812	12.008	.000
316.0	865846.7	23923.8	-1.503	60.119	-0.698	3.695	-20.661	12.012	.000
318.0	864606.1	23925.3	-1.505	60.130	-0.717	3.696	-19.498	12.016	.000
320.0	863362.3	23926.8	-1.506	60.141	-0.740	3.711	-18.332	12.020	.000
322.0	862117.5	23928.4	-1.507	60.153	-0.747	3.719	-17.164	12.024	.000
324.0	860871.6	23929.9	-1.509	60.164	-0.774	3.728	-15.992	12.028	.000
326.0	859624.7	23931.4	-1.510	60.176	-0.782	3.737	-14.815	12.032	.000
328.0	858376.6	23933.0	-1.512	60.188	-0.798	3.750	-13.641	12.036	.000
330.0	857127.5	23934.5	-1.513	60.200	-0.824	3.766	-12.461	12.040	.000
332.0	855877.4	23936.1	-1.514	60.212	-0.853	3.784	-11.280	12.044	.000
334.0	854626.3	23937.6	-1.516	60.224	-0.887	3.802	-10.094	12.048	.000
336.0	853374.0	23939.2	-1.517	60.236	-0.938	3.828	-8.897	12.052	.000
338.0	852120.8	23940.7	-1.518	60.249	-0.974	3.852	-7.695	12.057	.000
340.0	850866.5	23942.3	-1.520	60.262	-1.005	3.873	-6.495	12.061	.000
342.0	849611.3	23943.8	-1.521	60.275	-1.031	3.891	-5.271	12.065	.000
344.0	848355.0	23945.4	-1.522	60.288	-1.078	3.916	-4.036	12.069	.000
346.0	847097.7	23946.9	-1.523	60.301	-1.128	3.943	-2.802	12.073	.000
348.0	845839.4	23948.5	-1.525	60.314	-1.168	3.951	-1.553	12.077	.000
350.0	844580.1	23950.0	-1.526	60.327	-1.240	3.967	-2.294	12.082	.000
352.0	843319.9	23951.6	-1.527	60.341	-1.368	3.935	.980	12.086	.000
354.0	842058.7	23953.2	-1.529	60.354	-1.519	3.876	2.261	12.090	.000
356.0	840796.5	23954.7	-1.530	60.368	-1.674	3.806	3.546	12.094	.000
358.0	839533.3	23956.3	-1.531	60.382	-1.864	3.696	4.844	12.099	.000

***** ST1987 USING FLAIK19, INERTIAL-BT19D19, NP0264 DYN. DATA.
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TIME (SEC)	ALTITUDE (FT)	VELA (FPS)	GAMA (DEG)	HGDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
360.0	838269.2	23957.3	-1.532	60.396	-2.050	3.575	6.154	12.103	.000
362.0	637004.1	23959.4	-1.533	60.410	-2.242	3.452	7.466	12.107	.000
364.0	835736.0	23961.0	-1.535	60.425	-2.438	3.325	8.792	12.112	.000
366.0	834471.1	23962.5	-1.536	60.439	-2.647	3.197	10.117	12.116	.000
368.0	833205.2	23964.1	-1.537	60.454	-2.824	3.056	11.452	12.121	.000
370.0	831934.4	23965.7	-1.538	60.469	-3.028	2.898	12.800	12.125	.000
372.0	830664.7	23967.2	-1.539	60.484	-3.254	2.700	14.150	12.129	.000
374.0	829394.0	23968.8	-1.541	60.499	-3.482	2.481	15.512	12.134	.000
376.0	828122.5	23970.4	-1.542	60.514	-3.709	2.258	16.876	12.138	.000
378.0	826850.0	23972.0	-1.543	60.530	-3.865	2.055	18.250	12.143	.000
380.0	825576.9	23973.6	-1.543	60.545	-3.858	1.937	19.237	12.147	.000
382.0	824303.3	23975.1	-1.545	60.561	-3.806	1.868	19.475	12.152	.000
384.0	823026.8	23976.7	-1.546	60.577	-3.740	1.801	19.680	12.157	.000
386.0	821753.5	23978.3	-1.547	60.593	-3.687	1.732	19.878	12.161	.000
388.0	820477.3	23979.9	-1.548	60.609	-3.616	1.674	20.024	12.166	.000
390.0	819200.2	23981.5	-1.549	60.625	-3.569	1.606	20.182	12.170	.000
392.0	817922.3	23983.1	-1.550	60.641	-3.517	1.549	20.352	12.175	.000
394.0	816643.5	23984.6	-1.551	60.658	-3.466	1.485	20.494	12.180	.000
396.0	815364.0	23986.2	-1.552	60.675	-3.411	1.425	20.614	12.185	.000
398.0	814083.5	23987.8	-1.553	60.692	-3.361	1.364	20.753	12.189	.000
400.0	812802.3	23989.4	-1.554	60.709	-3.313	1.307	20.898	12.194	.000
402.0	811520.3	23991.0	-1.555	60.726	-3.271	1.251	21.054	12.199	.000
404.0	810237.4	23992.6	-1.556	60.743	-3.231	1.197	21.223	12.204	.000
406.0	808953.8	23994.2	-1.557	60.760	-3.191	1.142	21.391	12.209	.000
408.0	807669.4	23995.7	-1.558	60.778	-3.145	1.089	21.511	12.213	.000
410.0	806384.2	23997.4	-1.559	60.796	-3.102	1.041	21.643	12.218	.000
412.0	805098.1	23999.0	-1.560	60.813	-3.065	.988	21.783	12.223	.000
414.0	803811.3	24000.5	-1.561	60.831	-3.023	.939	21.934	12.228	.000
416.0	802523.8	24002.1	-1.562	60.850	-2.988	.891	22.087	12.233	.000
418.0	801235.4	24003.7	-1.563	60.868	-2.955	.844	22.251	12.238	.000

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* ST198ET USING FLAIR19, INERTIAL-BY1G019, NP0264 DYN. DATA.

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TIME (SEC)	ALTOE (FT)	VELA (FPS)	GAMA (DEG)	HOGA (DEG)	SIGMA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (DEG)	DA (PSF)
420.0	799946.4	24005.3	-1.564	60.856	-2.915	.796	22.404	12.243	.000
422.0	796650.7	24006.9	-1.565	60.905	-2.886	.758	22.355	12.248	.000
424.0	797366.2	24003.5	-1.566	60.924	-2.864	.711	22.315	12.253	.000
426.0	796075.0	24010.1	-1.567	60.942	-2.832	.674	22.270	12.258	.000
428.0	794783.0	24011.7	-1.568	60.961	-2.809	.630	22.249	12.264	.000
430.0	793490.4	24013.3	-1.569	60.981	-2.782	.593	22.231	12.269	.000
432.0	792197.0	24014.9	-1.570	61.000	-2.754	.546	22.218	12.274	.000
434.0	790902.9	24016.5	-1.571	61.019	-2.731	.509	22.228	12.279	.000
436.0	789608.1	24018.2	-1.572	61.039	-2.714	.475	22.231	12.284	.000
438.0	788312.6	24019.8	-1.573	61.059	-2.690	.439	22.249	12.290	.000
440.0	787016.5	24021.4	-1.573	61.078	-2.675	.411	22.281	12.295	.000
442.0	785719.6	24023.0	-1.574	61.098	-2.662	.378	22.315	12.300	.000
444.0	784422.0	24024.6	-1.575	61.119	-2.645	.355	22.372	12.306	.000
446.0	783123.6	24026.2	-1.576	61.139	-2.631	.327	22.433	12.311	.000
448.0	781824.9	24027.8	-1.577	61.159	-2.611	.302	22.502	12.316	.000
450.0	780525.3	24029.4	-1.578	61.180	-2.598	.280	22.588	12.322	.000
452.0	779225.1	24031.0	-1.579	61.201	-2.595	.253	22.670	12.327	.000
454.0	777924.3	24032.6	-1.579	61.222	-2.588	.235	22.768	12.333	.000
456.0	776622.8	24034.2	-1.580	61.243	-2.584	.211	22.874	12.338	.000
458.0	775320.7	24035.9	-1.581	61.264	-2.575	.189	22.996	12.344	.000
460.0	774017.9	24037.5	-1.582	61.285	-2.573	.162	23.118	12.350	.000
462.0	772714.6	24039.1	-1.583	61.307	-2.580	.139	23.260	12.355	.000
464.0	771410.6	24040.7	-1.583	61.328	-2.589	.119	23.403	12.361	.000
466.0	770106.1	24042.3	-1.584	61.350	-2.593	.100	23.555	12.367	.000
468.0	768800.9	24044.0	-1.585	61.372	-2.607	.074	23.723	12.372	.000
470.0	767495.1	24045.6	-1.586	61.394	-2.622	.049	23.897	12.378	.000
472.0	766188.7	24047.2	-1.586	61.416	-2.641	.031	24.036	12.384	.000
474.0	764881.8	24048.8	-1.587	61.439	-2.662	.003	24.281	12.390	.000
476.0	763574.3	24050.4	-1.588	61.461	-2.693	-.023	24.480	12.396	.000
478.0	762266.2	24052.1	-1.589	61.484	-2.714	-.047	24.694	12.402	.000

***** ST198ET USING FLAIR19, INERTIAL-BT19D19, NP0264 DYN. DATA. *****

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TIME (SEC)	ALTDE (FT)	VELA (FPS)	GAMA (DEG)	HOGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PPSF)
400.0	760957.5	24053.7	-1.589	61.507	-2.743	-0.063	24.920	12.408	.000
402.0	759648.4	24055.3	-1.590	61.530	-2.764	-.091	25.150	12.414	.000
404.0	758338.7	24056.9	-1.591	61.553	-2.803	-.109	25.398	12.420	.000
406.0	757028.4	24058.6	-1.591	61.576	-2.829	-.133	25.637	12.426	.000
408.0	755717.7	24060.2	-1.592	61.599	-2.860	-.152	25.901	12.432	.000
410.0	754406.3	24061.8	-1.593	61.623	-2.893	-.168	26.162	12.438	.000
412.0	753094.5	24063.5	-1.593	61.646	-2.933	-.196	26.443	12.444	.000
414.0	751782.2	24065.1	-1.594	61.670	-2.974	-.206	26.734	12.450	.000
416.0	750469.4	24066.7	-1.595	61.694	-3.014	-.232	26.967	12.456	.000
418.0	749156.1	24068.3	-1.595	61.718	-3.050	-.245	27.170	12.463	.000
420.0	747842.3	24070.0	-1.596	61.743	-3.106	-.262	27.363	12.469	.000
422.0	746528.1	24071.6	-1.596	61.767	-3.150	-.275	27.518	12.475	.000
424.0	745213.4	24073.2	-1.597	61.792	-3.205	-.293	27.663	12.482	.000
426.0	743898.2	24074.9	-1.598	61.816	-3.257	-.305	27.819	12.488	.000
428.0	742582.6	24076.5	-1.598	61.841	-3.308	-.323	27.974	12.495	.000
430.0	741266.5	24078.1	-1.599	61.866	-3.363	-.337	28.150	12.501	.000
432.0	739950.0	24079.8	-1.599	61.891	-3.426	-.349	28.281	12.508	.000
434.0	738633.1	24081.4	-1.600	61.917	-3.481	-.367	28.405	12.514	.000
436.0	737315.8	24083.1	-1.600	61.942	-3.546	-.372	28.542	12.521	.000
438.0	735998.0	24084.7	-1.601	61.968	-3.488	-.314	28.704	12.528	.000
440.0	734679.9	24086.3	-1.602	61.993	-3.435	-.251	28.869	12.534	.000
442.0	733361.2	24088.0	-1.602	62.019	-3.380	-.193	29.045	12.541	.000
444.0	732042.2	24089.6	-1.603	62.045	-3.320	-.123	29.215	12.548	.000
446.0	730722.6	24091.3	-1.603	62.072	-3.279	-.054	29.342	12.555	.000
448.0	729403.0	24092.9	-1.604	62.098	-3.230	.011	29.492	12.562	.000
450.0	728082.9	24094.5	-1.604	62.124	-3.187	.078	29.644	12.569	.000
452.0	726762.3	24096.2	-1.605	62.151	-3.146	.147	29.807	12.576	.000
454.0	725441.3	24097.8	-1.605	62.178	-3.100	.212	29.979	12.583	.000
456.0	724120.1	24099.4	-1.605	62.205	-3.073	.286	30.128	12.590	.000
458.0	722798.4	24101.1	-1.606	62.232	-3.035	.354	30.248	12.597	.000

* ST198 ET USING FLAIR19, INERTIAL-BT14019, NP0264 DYN. DATA.
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TIME (SEC)	ALTITUDE (FT)	VELA (FPS)	GAMA (DEG)	HDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
540.0	721476.4	24102.8	-1.606	62.259	-3.010	.426	30.337	12.604	.000
542.0	720154.1	24104.4	-1.607	62.256	-2.982	.500	30.531	12.611	.000
544.0	718831.5	24106.0	-1.607	62.314	-2.955	.572	30.679	12.619	.000
546.0	717508.5	24107.7	-1.608	62.342	-2.929	.646	30.841	12.626	.000
548.0	716185.3	24109.3	-1.608	62.369	-2.905	.723	31.014	12.633	.000
550.0	714661.6	24111.0	-1.608	62.397	-2.887	.797	31.188	12.641	.000
552.0	713537.6	24112.6	-1.609	62.425	-2.872	.877	31.247	12.648	.000
554.0	712213.6	24114.2	-1.609	62.454	-2.857	.953	31.269	12.656	.000
556.0	710839.2	24115.9	-1.609	62.482	-2.841	1.032	31.297	12.663	.000
558.0	709564.5	24117.6	-1.610	62.511	-2.839	1.112	31.336	12.671	.000
560.0	708239.5	24119.2	-1.610	62.539	-2.833	1.186	31.373	12.678	.000
562.0	706914.2	24120.8	-1.610	62.568	-2.823	1.270	31.429	12.686	.000
564.0	705556.7	24122.5	-1.611	62.597	-2.828	1.349	31.492	12.694	.000
566.0	704262.8	24124.1	-1.611	62.626	-2.826	1.428	31.567	12.702	.000
568.0	702936.7	24125.8	-1.611	62.656	-2.832	1.506	31.648	12.710	.000
570.0	701610.4	24127.4	-1.612	62.685	-2.832	1.588	31.742	12.718	.000
572.0	700283.8	24129.1	-1.612	62.715	-2.844	1.667	31.842	12.726	.000
574.0	698957.1	24130.8	-1.612	62.745	-2.851	1.746	31.944	12.734	.000
576.0	697630.1	24132.4	-1.613	62.774	-2.872	1.828	32.059	12.742	.000
578.0	696302.8	24134.1	-1.613	62.805	-2.889	1.911	32.181	12.750	.000
580.0	694975.4	24135.7	-1.613	62.835	-2.912	1.962	32.313	12.758	.000
582.0	693647.6	24137.4	-1.613	62.865	-2.963	1.989	32.457	12.766	.000
584.0	692320.0	24139.0	-1.614	62.896	-3.011	1.992	32.607	12.775	.000
586.0	690991.9	24140.7	-1.614	62.926	-3.078	1.956	32.765	12.783	.000
588.0	689663.7	24142.3	-1.614	62.957	-3.148	1.918	32.934	12.792	.000
590.0	688335.3	24144.0	-1.614	62.988	-3.226	1.886	33.105	12.800	.000
592.0	687006.7	24145.6	-1.615	63.019	-3.292	1.854	33.292	12.809	.000
594.0	685678.0	24147.3	-1.615	63.050	-3.372	1.819	33.478	12.817	.000
596.0	684349.1	24148.9	-1.615	63.082	-3.456	1.784	33.684	12.826	.000
598.0	683020.0	24150.6	-1.615	63.113	-3.532	1.743	33.903	12.835	.000

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 * ST1986T USING FLAIR19, INERTIAL-BT19D19, NP0264 DYN. DATA.
 * PAGE 11

TIME (SEC)	ALTDE (FT)	VELA (FPS)	GAMA (DEG)	HOGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
600.0	681690.8	24152.2	-1.615	63.145	-3.619	1.712	34.118	12.844	.000
602.0	680361.5	24153.9	-1.615	63.177	-3.698	1.670	34.350	12.852	.000
604.0	679034.0	24155.6	-1.616	63.209	-3.806	1.583	34.591	12.861	.000
606.0	677792.5	24157.2	-1.616	63.241	-3.918	1.491	34.828	12.870	.000
608.0	676372.8	24158.9	-1.616	63.273	-4.023	1.391	35.077	12.879	.000
610.0	675043.1	24160.5	-1.616	63.306	-4.139	1.295	35.276	12.889	.000
612.0	673713.3	24162.2	-1.616	63.338	-4.246	1.203	35.248	12.898	.000
614.0	672333.5	24163.8	-1.616	63.371	-4.371	1.115	35.237	12.907	.000
616.0	671053.6	24165.5	-1.616	63.404	-4.486	1.032	35.223	12.916	.000
618.0	669723.6	24167.1	-1.616	63.437	-4.610	.930	35.232	12.926	.000
620.0	668393.5	24168.6	-1.616	63.470	-4.722	.849	35.240	12.935	.000
622.0	667063.4	24170.5	-1.616	63.504	-4.728	.846	35.270	12.945	.000
624.0	665733.2	24172.1	-1.616	63.537	-4.741	.843	35.303	12.955	.000
626.0	664402.9	24173.8	-1.616	63.571	-4.757	.837	35.354	12.964	.000
628.0	663072.6	24175.4	-1.617	63.605	-4.768	.832	35.414	12.974	.000
630.0	661742.3	24177.1	-1.617	63.639	-4.786	.835	35.473	12.984	.000
632.0	660411.9	24178.7	-1.617	63.673	-4.799	.830	35.545	12.994	.000
634.0	659034.4	24180.4	-1.617	63.707	-4.823	.830	35.634	13.004	.000
636.0	657751.0	24182.1	-1.617	63.742	-4.842	.830	35.723	13.014	.000
638.0	656420.6	24183.7	-1.617	63.776	-4.864	.834	35.814	13.024	.000
640.0	655090.2	24185.4	-1.617	63.811	-4.793	.923	35.937	13.903	.000
642.0	653729.8	24187.1	-1.616	63.846	-4.714	1.014	36.068	13.913	.000
644.0	652429.4	24188.7	-1.617	63.881	-4.631	1.104	36.202	13.923	.000
646.0	651099.0	24190.4	-1.616	63.916	-4.568	1.184	36.342	13.933	.000
648.0	649768.6	24192.0	-1.616	63.951	-4.504	1.217	36.500	13.943	.000
650.0	648438.2	24193.7	-1.616	63.987	-4.456	1.249	36.661	13.954	.000
652.0	647107.9	24195.3	-1.616	64.022	-4.406	1.282	36.837	13.964	.000
654.0	645777.7	24197.0	-1.616	64.058	-4.362	1.309	37.013	13.974	.000
656.0	644447.5	24198.7	-1.616	64.094	-4.313	1.344	37.203	13.985	.000
658.0	643117.3	24200.3	-1.616	64.130	-4.279	1.377	37.400	13.995	.000

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TIME (SEC)	ALTITUDE (FT)	VELA (FPS)	GAMA (DEG)	HDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	PSFI (-)
			660.0	24202.0	-1.616	64.166	-4.238	1.408	37.607
662.0	640457.2	24203.6	-1.616	64.203	-4.206	1.444	37.816	14.017	.000
664.0	6391127.3	24205.3	-1.616	64.239	-4.169	1.480	38.041	14.027	.000
666.0	637797.4	24206.4	-1.615	64.276	-4.140	1.515	38.267	14.038	.000
668.0	636467.7	24208.6	-1.615	64.313	-4.110	1.552	38.512	14.049	.000
670.0	635138.1	24210.3	-1.615	64.350	-4.087	1.582	38.758	14.060	.000
672.0	633808.9	24212.0	-1.615	64.367	-4.075	1.585	38.959	14.072	.000
674.0	632479.3	24213.6	-1.615	64.424	-4.072	1.563	39.135	14.083	.000
676.0	631150.1	24215.3	-1.615	64.462	-4.062	1.547	39.293	14.094	.000
678.0	629821.0	24216.9	-1.614	64.499	-4.065	1.512	39.460	14.106	.000
680.0	628492.0	24218.6	-1.614	64.537	-4.068	1.494	39.632	14.117	.000
682.0	627163.2	24220.2	-1.614	64.575	-4.065	1.471	39.772	14.129	.000
684.0	625834.6	24221.9	-1.614	64.613	-4.075	1.451	39.903	14.140	.000
686.0	624535.1	24223.5	-1.614	64.651	-4.084	1.429	40.041	14.152	.000
688.0	623177.8	24225.2	-1.613	64.690	-4.096	1.407	40.191	14.164	.000
690.0	621649.6	24226.8	-1.613	64.728	-4.105	1.388	40.353	14.176	.000
692.0	620521.7	24228.5	-1.613	64.767	-4.124	1.362	40.517	14.188	.000
694.0	619193.9	24230.2	-1.613	64.806	-4.145	1.336	40.686	14.200	.000
696.0	617866.3	24231.8	-1.612	64.345	-4.163	1.315	40.812	14.213	.000
698.0	616539.0	24233.5	-1.612	64.884	-4.181	1.297	40.951	14.225	.000
700.0	615211.8	24235.2	-1.612	64.923	-4.203	1.275	41.093	14.238	.000
702.0	613884.9	24236.8	-1.611	64.963	-4.234	1.250	41.243	14.250	.000
704.0	612558.2	24238.5	-1.611	65.002	-4.258	1.230	41.403	14.263	.000
706.0	611231.8	24240.1	-1.611	65.042	-4.288	1.211	41.568	14.276	.000
708.0	609905.6	24241.8	-1.610	65.082	-4.324	1.182	41.735	14.289	.000
710.0	608579.6	24243.4	-1.610	65.122	-4.361	1.161	41.860	14.302	.000
712.0	607253.9	24245.1	-1.610	65.162	-4.403	1.135	41.994	14.315	.000
714.0	605928.4	24246.7	-1.609	65.202	-4.450	1.109	42.133	14.328	.000
716.0	604603.2	24248.4	-1.609	65.243	-4.494	1.083	42.281	14.342	.000
718.0	603276.3	24250.1	-1.609	65.284	-4.540	1.059	42.447	14.355	.000

***** ST198ET USING FLAIR19, INERTIAL-BT16019, NP0264 DYN. DATA. *****
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TIME (SEC)	ALTDE (FT)	VELA (FPS)	GAMA (DEG)	HDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
720.0	601953.6	24251.7	-1.608	65.324	-4.591	1.029	42.616	14.369	.000
722.0	600629.3	24253.4	-1.608	65.365	-4.643	1.001	42.790	14.383	.000
724.0	599305.2	24255.0	-1.608	65.406	-4.693	.977	42.921	14.396	.000
726.0	597981.4	24256.7	-1.607	65.448	-4.753	.948	43.057	14.410	.000
728.0	596656.0	24258.3	-1.607	65.489	-4.814	.920	43.208	14.425	.000
730.0	595334.9	24260.0	-1.606	65.531	-4.872	.899	43.367	14.439	.000
732.0	594012.1	24261.6	-1.606	65.572	-4.934	.869	43.528	14.453	.000
734.0	592689.6	24263.3	-1.605	65.614	-4.990	.846	43.680	14.468	.000
736.0	591367.5	24264.9	-1.605	65.656	-5.061	.794	43.690	14.482	.000
738.0	590045.8	24266.6	-1.604	65.698	-5.132	.698	43.714	14.497	.000
740.0	588724.4	24268.3	-1.604	65.740	-5.336	.375	43.740	14.512	.000
742.0	587403.6	24269.9	-1.603	65.782	-4.103	.277	43.511	14.527	.000
744.0	586033.4	24271.6	-1.602	65.825	-1.765	.168	42.882	14.542	.000
746.0	584763.6	24273.3	-1.602	65.868	-4.54	.323	42.222	14.558	.000
748.0	583444.5	24274.9	-1.601	65.911	.422	.371	.627	14.573	.000
750.0	582125.5	24276.6	-1.601	65.954	1.031	.382	.071	14.589	.000
752.0	580807.0	24278.3	-1.600	65.998	1.502	.461	.346	14.604	.000
754.0	579436.8	24279.9	-1.600	66.041	1.554	.335	.077	14.620	.000
756.0	578171.1	24281.6	-1.599	66.035	1.554	.253	.638	14.636	.000
758.0	576853.8	24283.2	-1.598	66.129	1.615	.453	.184	14.652	.000
760.0	575536.8	24284.9	-1.598	66.172	1.343	.387	.908	14.669	.000
762.0	574220.2	24286.6	-1.598	66.216	.904	.186	.770	14.685	.000
764.0	572904.0	24288.3	-1.597	66.260	.454	.021	.833	14.702	.000
766.0	571588.2	24289.9	-1.596	66.305	.014	.227	.905	14.719	.000
768.0	570272.8	24291.6	-1.596	66.349	.247	.269	.999	14.736	.000
770.0	568957.9	24293.2	-1.595	66.394	.345	.167	.123	14.753	.000
772.0	567643.5	24294.9	-1.595	66.439	.449	.071	.254	14.770	.000
774.0	566329.5	24296.5	-1.594	66.484	.556	.026	.391	14.787	.000
776.0	565016.1	24298.1	-1.593	66.529	.660	.125	.540	14.805	.000
778.0	563703.1	24299.8	-1.593	66.574	.784	.160	.696	14.823	.000

* T19BET USING FLA1319, INERTIAL-BT19D19, NPO264 DYN. DATA.

Time (SEC)	ALTde (FT)	VELA (PSI)	GAMA (DEG)	HDCGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
750.0	562390.5	24301.4	-1.592	66.619	-0.951	0.035	39.862	14.841	.000
762.0	561076.5	24303.1	-1.591	66.665	-1.132	-0.243	40.030	14.859	.000
764.0	559767.0	24304.7	-1.591	66.710	-1.158	-0.359	40.230	14.877	.000
776.0	558456.1	24306.4	-1.590	66.756	-1.025	-0.324	40.453	14.895	.000
786.0	557145.6	24308.0	-1.589	66.802	-0.795	-0.212	40.697	14.914	.001
796.0	555835.6	24309.7	-1.589	66.848	-0.573	-0.078	40.952	14.933	.001
796.0	554526.2	24311.3	-1.588	66.894	-0.346	0.047	41.211	14.952	.001
794.0	553247.3	24312.9	-1.587	66.941	-0.133	0.179	41.410	14.971	.001
796.0	551909.1	24314.5	-1.586	66.986	0.093	0.312	41.446	14.990	.001
796.0	550601.5	24316.2	-1.585	67.034	0.238	0.384	41.407	15.010	.001
800.0	549294.4	24317.8	-1.585	67.081	0.247	0.306	41.348	15.030	.001
802.0	547486.0	24319.4	-1.584	67.128	0.220	0.222	41.183	15.050	.001
804.0	546632.2	24321.1	-1.583	67.175	0.197	0.141	41.010	15.070	.001
806.0	545376.9	24322.7	-1.582	67.223	0.175	0.052	40.850	15.090	.001
808.0	544072.3	24324.3	-1.581	67.270	0.152	-0.028	40.697	15.111	.001
810.0	542708.3	24326.0	-1.581	67.318	0.128	-0.110	40.558	15.132	.001
812.0	541404.8	24327.6	-1.580	67.366	0.098	-0.192	40.426	15.153	.001
814.0	540161.9	24329.2	-1.579	67.414	0.064	-0.284	40.300	15.174	.001
816.0	538859.7	24330.9	-1.578	67.462	0.020	-0.368	40.184	15.195	.001
818.0	537556.1	24332.5	-1.577	67.510	-0.013	-0.450	40.077	15.217	.001
820.0	536257.1	24334.2	-1.577	67.558	0.152	-0.345	40.005	15.239	.001
822.0	534956.8	24335.8	-1.576	67.607	0.318	-0.228	39.934	15.261	.001
824.0	533657.1	24337.4	-1.575	67.655	0.487	-0.121	39.884	15.283	.001
826.0	532358.0	24339.0	-1.574	67.704	0.659	-0.007	39.840	15.306	.001
828.0	531054.6	24340.7	-1.573	67.753	0.824	0.107	39.804	15.329	.001
830.0	529761.9	24342.3	-1.572	67.803	0.989	0.216	39.769	15.352	.001
832.0	528464.9	24343.9	-1.571	67.852	1.153	0.330	39.751	15.375	.001
834.0	527108.5	24345.5	-1.570	67.901	1.311	0.437	39.735	15.399	.001
836.0	525872.6	24347.2	-1.569	67.951	1.352	0.443	39.743	15.423	.001
838.0	524577.3	24348.6	-1.569	68.001	1.278	0.341	39.778	15.447	.001

ORIGINAL PAGE IS
OF POOR QUALITY

* T19BET USING FLAIR19, INERTIAL - AT 19019, NP0264 DYN. DATA.

TIME (SEC)	ALT&E (FT)	VELA (FPS)	GAMA (DEG)	HUGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
840.0	523283.5	24350.4	-1.568	68.051	1.197	.242	39.815	15.471	.001
642.0	521989.9	24352.0	-1.567	68.101	1.106	.143	39.859	15.496	.001
844.0	520697.1	24353.7	-1.566	68.151	1.028	.050	39.920	15.520	.001
646.0	519405.0	24355.3	-1.565	68.201	.940	-.056	39.985	15.546	.001
848.0	518113.5	24356.9	-1.564	68.252	.860	-.149	40.056	15.571	.001
850.0	516822.8	24353.5	-1.563	68.302	.784	-.177	40.142	15.597	.001
652.0	515532.9	24360.1	-1.562	68.353	.779	.113	40.226	15.623	.001
354.0	514243.6	24361.8	-1.561	68.404	.692	.343	40.325	15.649	.001
356.0	512955.2	24363.4	-1.560	68.455	.229	.164	40.473	15.675	.001
856.0	511667.6	24365.0	-1.559	68.507	-.267	-.086	40.631	15.702	.001
860.0	510386.7	24366.6	-1.558	68.556	-.641	-.232	40.806	15.729	.001
862.0	509094.5	24368.2	-1.557	68.610	-.922	-.277	41.004	15.757	.001
864.0	507609.2	24369.8	-1.556	68.661	-1.207	-.332	41.188	15.785	.001
866.0	506524.7	24371.4	-1.555	68.713	-1.485	-.382	41.297	15.813	.001
868.0	505241.0	24373.0	-1.554	68.765	-1.774	-.442	41.274	15.841	.001
870.0	503958.2	24374.7	-1.552	68.817	-1.856	-.402	41.242	15.870	.001
872.0	502676.3	24376.3	-1.551	68.870	-1.659	-.199	41.123	15.899	.001
874.0	501395.2	24377.9	-1.550	68.922	-1.482	-.102	40.992	15.928	.001
876.0	500114.9	24379.5	-1.549	68.975	-1.306	-.023	40.871	15.958	.001
878.0	498835.4	24381.1	-1.548	69.027	-1.119	.062	40.770	15.988	.001
880.0	497556.6	24382.7	-1.547	69.080	-.964	.136	40.668	16.018	.001
882.0	496279.1	24384.3	-1.546	69.133	-.801	.214	40.579	16.049	.001
884.0	495002.2	24385.9	-1.545	69.186	-.625	.298	40.494	16.080	.001
886.0	493726.1	24387.5	-1.543	69.240	-.465	.373	40.428	16.112	.001
888.0	492450.9	24389.1	-1.542	69.293	-.319	.427	40.369	16.144	.001
890.0	491176.6	24390.7	-1.541	69.347	-.192	.377	40.309	16.176	.002
892.0	489903.1	24392.3	-1.540	69.401	-.076	.331	40.265	16.209	.002
894.0	488630.6	24393.9	-1.539	69.455	.044	.280	40.220	16.242	.002
896.0	487358.9	24395.5	-1.538	69.509	.166	.232	40.191	16.275	.002
898.0	486086.1	24397.1	-1.536	69.563	.283	.179	40.167	16.309	.002

 * ST19821 USING FLAIR19, INERTIAL-3T19D19, NPO264 DYN. DATA.
 * *****

TIME (SEC)	ALTDE (FT)	VELA (FPS)	GAMA (DEG)	HDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	DA (PSF)
900.0	4944816.3	24398.7	-1.535	69.617	.400	.137	40.155	16.344	.002
902.0	483549.4	24400.3	-1.534	69.672	.508	.087	40.144	16.378	.002
904.0	432281.3	24401.9	-1.533	69.727	.604	.031	40.145	16.413	.002
906.0	461014.3	24403.5	-1.531	69.761	.714	-.021	40.155	16.449	.002
908.0	479748.1	24405.1	-1.530	69.836	.815	-.072	40.176	16.485	.002
910.0	478483.0	24406.6	-1.529	69.892	.947	-.028	40.202	16.522	.002
912.0	477215.7	24408.2	-1.528	69.947	1.104	.235	40.242	16.559	.002
914.0	475955.5	24409.8	-1.526	70.002	1.160	.358	40.295	16.596	.002
916.0	474693.2	24411.4	-1.525	70.058	1.060	.363	40.370	16.634	.002
918.0	473431.8	24413.0	-1.524	70.113	.998	.363	40.457	16.672	.002
920.0	472171.4	24414.6	-1.523	70.169	.914	.360	40.550	16.711	.002
922.0	470912.1	24416.2	-1.521	70.225	.828	.365	40.658	16.751	.002
924.0	469653.7	24417.7	-1.520	70.281	.744	.365	40.768	16.791	.002
926.0	468396.4	24419.3	-1.519	70.338	.648	.360	40.886	16.831	.002
928.0	467140.0	24420.9	-1.517	70.394	.549	.355	41.017	16.872	.002
930.0	465884.7	24422.4	-1.516	70.451	.462	.350	41.127	16.914	.003
932.0	464630.4	24424.0	-1.515	70.506	.359	.343	41.212	16.956	.003
934.0	463377.1	24425.6	-1.513	70.564	.249	.335	41.131	16.999	.003
936.0	462124.9	24427.2	-1.512	70.621	.095	.101	41.031	17.042	.003
938.0	460873.6	24428.7	-1.510	70.678	-.083	-.176	40.939	17.086	.003
940.0	459623.7	24430.3	-1.509	70.736	-.093	-.287	40.871	17.130	.003
942.0	458374.7	24431.9	-1.508	70.793	.080	-.237	40.838	17.175	.003
944.0	457126.7	24433.4	-1.506	70.851	.224	-.199	40.814	17.221	.003
946.0	455679.6	24435.0	-1.505	70.909	.384	-.151	40.793	17.267	.003
948.0	454634.0	24436.6	-1.503	70.967	.534	-.107	40.781	17.314	.003
950.0	453389.3	24438.1	-1.502	71.025	.681	-.058	40.781	17.362	.003
952.0	452145.6	24439.7	-1.501	71.083	.830	-.021	40.787	17.410	.003
954.0	450903.1	24441.3	-1.499	71.141	.966	.019	40.799	17.459	.004
956.0	449661.6	24442.8	-1.498	71.199	1.109	.070	40.817	17.509	.004
958.0	448421.2	24444.4	-1.496	71.258	1.241	.112	40.854	17.559	.004

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OF POOR QUALITY

***** SI 198ET USING FLAIR19, INERTIAL-BT19019, NP0264 DYN. DATA.

PAGE 17 *

TIME (SEC)	ALTDE (FT)	VELA (FPS)	GAMA (DEG)	HDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
960.0	447182.0	24446.0	-1.495	71.317	1.396	.361	-40.895	17.610	.004
962.0	445943.9	24447.5	-1.493	71.376	1.244	.349	-40.981	17.662	.004
964.0	444707.0	24449.0	-1.492	71.435	1.093	.336	-40.968	17.715	.004
966.0	443471.2	24450.6	-1.490	71.494	.943	.321	-40.869	17.769	.004
968.0	442236.6	24452.2	-1.489	71.553	.769	.300	-40.783	17.823	.004
970.0	441003.1	24453.7	-1.487	71.613	.612	.280	-40.705	17.878	.005
972.0	439770.9	24455.2	-1.486	71.672	.439	.265	-40.634	17.934	.005
974.0	438539.7	24456.8	-1.484	71.732	.261	.236	-40.573	17.991	.005
976.0	437309.7	24458.3	-1.483	71.792	.090	.220	-40.520	18.048	.005
978.0	436081.0	24459.9	-1.481	71.852	-.096	.188	-40.476	18.107	.005
980.0	434853.4	24461.4	-1.479	71.912	-.281	.166	-40.440	18.166	.005
982.0	433626.9	24462.9	-1.478	71.972	-.461	.140	-40.412	18.227	.006
984.0	432401.7	24464.5	-1.476	72.033	-.660	.113	-40.391	18.288	.006
986.0	431177.7	24466.0	-1.475	72.094	-.650	.084	-40.382	18.351	.006
988.0	429954.9	24467.6	-1.473	72.154	-.1.060	.058	-40.378	18.414	.006
990.0	428733.3	24469.1	-1.472	72.215	-.252	-.188	-40.389	18.478	.006
992.0	427513.0	24470.7	-1.470	72.276	-.250	-.356	-40.425	18.544	.007
994.0	426293.8	24472.2	-1.468	72.337	-.030	-.303	-40.498	18.610	.007
996.0	425076.0	24473.7	-1.467	72.398	-.781	-.227	-40.577	18.678	.007
998.0	423859.3	24475.2	-1.465	72.460	-.534	-.142	-40.663	18.747	.007
1000.0	422643.9	24476.8	-1.463	72.521	-.285	-.054	-40.761	18.817	.008
1002.0	421429.7	24478.3	-1.462	72.583	-.046	.027	-40.864	18.888	.008
1004.0	420216.9	24479.8	-1.460	72.645	.184	.106	-40.979	18.960	.008
1006.0	419005.3	24481.3	-1.458	72.707	.416	.191	-41.055	19.034	.008
1008.0	417795.0	24482.8	-1.457	72.769	.648	.272	-41.119	19.109	.009
1010.0	416586.1	24484.4	-1.455	72.831	.874	.353	-41.046	19.185	.009
1012.0	415376.4	24485.9	-1.453	72.894	1.094	.437	-40.931	19.262	.009
1014.0	414172.1	24487.4	-1.452	72.956	1.181	.387	-40.844	19.341	.010
1016.0	412967.1	24489.9	-1.450	73.019	1.164	.248	-40.772	19.422	.010
1018.0	411763.4	24490.4	-1.448	73.082	1.184	.120	-40.712	19.504	.011

ORIGINAL PAGE IS
OF POOR QUALITY

***** ST148ET USING FLAIR19, INERTIAL-BT14019, NPO264 DYN. DATA. PAGE 18 *****

TIME (SEC)	ALTDE (FT)	VELA (FPS)	GAAMA (DEG)	HOGA (DEG)	SIGMA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
1020.0	410501.1	244491.9	-1.446	73.145	1.181	.141	40.653	19.587
1022.0	406360.0	24493.4	-1.445	73.208	1.217	.266	40.602	19.671
1024.0	406160.3	24494.9	-1.443	73.271	1.260	.400	40.559	19.754
1026.0	40691.9	24496.4	-1.441	73.334	1.179	.418	40.528	19.839
1028.0	405765.0	24497.9	-1.439	73.398	.975	.331	40.529	19.924
1030.0	404569.3	24499.4	-1.438	73.461	.775	.246	40.527	20.010
1032.0	403375.0	24500.9	-1.436	73.525	.569	.156	40.539	20.097
1034.0	402182.0	24502.4	-1.434	73.589	.358	.067	40.554	20.184
1036.0	400990.5	24503.9	-1.432	73.653	.144	-.030	40.577	20.273
1038.0	399800.3	24505.4	-1.430	73.717	-.061	-.123	40.605	20.362
1040.0	398611.5	24506.9	-1.429	73.781	-.310	-.221	40.637	20.451
1042.0	397424.1	24508.4	-1.427	73.846	-.542	-.325	40.633	20.541
1044.0	396236.1	24509.9	-1.425	73.910	-.696	-.353	40.737	20.632
1046.0	395053.6	24511.3	-1.423	73.975	-.709	-.245	40.824	20.723
1048.0	393870.4	24512.8	-1.421	74.040	-.723	-.141	40.912	20.815
1050.0	392688.7	24514.3	-1.419	74.105	-.750	-.045	40.981	20.907
1052.0	391503.4	24515.7	-1.417	74.170	-.787	-.049	41.023	21.000
1054.0	390329.6	24517.2	-1.416	74.235	-.829	-.152	41.055	21.093
1056.0	389152.2	24518.7	-1.414	74.300	-.919	-.043	41.040	21.186
1058.0	387976.3	24520.1	-1.412	74.366	-.1.043	-.261	41.031	21.279
1060.0	386801.9	24521.6	-1.410	74.431	-.897	-.305	40.959	21.373
1062.0	385629.0	24523.1	-1.408	74.497	-.705	-.303	40.866	21.467
1064.0	384457.6	24524.5	-1.406	74.563	-.525	-.298	40.776	21.561
1066.0	383237.6	24526.0	-1.404	74.629	-.326	-.295	40.702	21.655
1068.0	382119.1	24527.5	-1.402	74.695	-.148	-.294	40.627	21.749
1070.0	380952.1	24528.9	-1.400	74.761	-.029	-.297	40.561	21.843
1072.0	379786.6	24530.4	-1.398	74.827	.197	-.309	40.500	21.937
1074.0	378622.6	24531.8	-1.396	74.894	.370	-.314	40.442	22.031
1076.0	377460.2	24533.2	-1.394	74.961	.584	-.069	40.390	22.124
1078.0	376249.2	24534.7	-1.392	75.027	.788	.183	40.334	22.218

***** ST198ET USING FLAIR19, INERTIAL-RT16D19, NP0264 DYN. DATA. *****

PAGE 19

TIME (SEC)	ALT&E (FT)	VELA (FPS)	GAMA (DEG)	HDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)	
1060.0	375139.8	245236.1	-1.390	75.094	• 931	-40.301	22.311	• 041		
1062.0	373981.9	245337.6	-1.386	75.161	• 908	-40.282	22.404	• 043		
1064.0	372625.6	24539.0	-1.386	75.228	• 875	-40.275	22.496	• 045		
1066.0	371670.6	24540.4	-1.384	75.296	• 833	-40.272	22.588	• 047		
1068.0	370517.6	24541.9	-1.382	75.363	• 777	-40.266	22.680	• 050		
1090.0	369366.0	24543.3	-1.380	75.431	• 725	-40.271	22.770	• 052		
1092.0	368215.9	24544.7	-1.378	75.498	• 659	-40.276	22.861	• 055		
1094.0	367067.4	24546.1	-1.376	75.566	• 571	-40.289	22.950	• 058		
1096.0	365920.5	24547.5	-1.374	75.634	• 426	-40.297	23.039	• 061		
1098.0	364775.2	24548.9	-1.372	75.702	• 277	-0.61	40.307	23.127	• 064	
1100.0	363631.5	24550.4	-1.370	75.770	• 138	-314	40.324	23.215	• 067	
1102.0	362489.5	24551.8	-1.368	75.838	• 209	-357	40.350	23.301	• 070	
1104.0	361349.0	24553.1	-1.366	75.907	• 321	-173	40.382	23.386	• 074	
1106.0	360210.2	24554.5	-1.363	75.975	• 432	025	40.410	23.471	• 078	
1108.0	359073.1	24555.9	-1.361	76.044	• 531	218	40.440	23.554	• 082	
1110.0	357937.6	24557.3	-1.359	76.112	• 635	416	40.464	23.637	• 086	
1112.0	356803.9	24558.6	-1.357	76.181	• 494	386	40.502	23.718	• 090	
1114.0	355671.8	24560.0	-1.355	76.250	• 206	233	40.555	23.798	• 095	
1116.0	354541.4	24561.4	-1.352	76.319	-0.95	068	40.602	23.877	• 100	ORIGINAL
1118.0	353412.8	24562.7	-1.350	76.388	-396	-104	40.642	23.955	• 105	OF POOR
1120.0	352285.9	24564.0	-1.348	76.458	-715	-280	40.671	24.031	• 111	QUALITY
1122.0	351160.8	24565.4	-1.346	76.527	-835	-279	40.711	24.106	• 117	
1124.0	350037.4	24566.7	-1.343	76.597	-820	-142	40.754	24.179	• 123	
1126.0	348915.8	24566.0	-1.341	76.666	-814	-013	40.789	24.251	• 129	
1128.0	347796.0	24569.3	-1.339	76.736	-816	120	40.807	24.322	• 136	
1130.0	346676.0	24570.6	-1.336	76.806	-864	079	40.816	24.391	• 143	
1132.0	345561.9	24571.9	-1.334	76.876	-984	-223	40.808	24.458	• 151	
1134.0	344447.6	24573.1	-1.332	76.946	-872	-303	40.812	24.524	• 159	
1136.0	343335.1	24574.4	-1.329	77.016	-632	-262	40.804	24.588	• 167	
1138.0	342224.6	24575.7	-1.327	77.087	-410	-228	40.793	24.651	• 176	

* ST1967T USING FLAIR19, INERTIAL-BT19D19, NP0264 DYN. DATA.
***** PAGE 20

TIME (SFC)	ALTITUDE (FT)	VELA (FPS)	GAMMA (DEG)	HOGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
1140.0	341115.9	24576.9	-1•324	77•157	-•186	-•198	40•753	24•712	•185
1142.0	340009.1	24578.2	-1•322	77•226	•025	-•172	40•706	24•771	•195
1144.0	330934.3	24579.4	-1•320	77•299	•236	-•148	40•635	24•828	•205
1146.0	337801.3	24580.6	-1•317	77•369	•444	-•131	40•558	24•884	•216
1148.0	336700.4	24581.8	-1•315	77•440	•658	-•115	40•451	24•938	•227
1150.0	335601.4	24583.0	-1•312	77•512	•874	-•056	40•329	24•990	•239
1152.0	334504.4	24584.2	-1•309	77•583	1•137	•224	40•188	25•041	•252
1154.0	333439.4	24585.4	-1•307	77•654	1•191	•305	40•036	25•090	•265
1156.0	332316.5	24586.5	-1•304	77•725	1•073	•231	39•885	25•137	•279
1158.0	331225.6	24587.7	-1•302	77•797	•935	•138	39•706	25•182	•294
1160.0	330136.9	24588.8	-1•299	77•868	•784	•052	39•504	25•225	•309
1162.0	329030.3	24589.9	-1•296	77•940	•628	-•048	39•269	25•267	•325
1164.0	327965.7	24591.1	-1•294	78•012	•442	-•156	39•263	25•307	•348
1166.0	326683.3	24592.2	-1•291	78•084	•232	-•282	39•248	25•345	•366
1168.0	325803.1	24593.3	-1•288	78•156	•066	-•373	39•225	25•381	•385
1170.0	324725.0	24594.3	-1•285	78•228	•079	-•326	39•250	25•416	•405
1172.0	323649.3	24595.4	-1•283	78•300	•068	-•289	39•316	25•449	•427
1174.0	322575.7	24596.5	-1•280	78•373	•059	-•271	39•462	25•480	•448
1176.0	321504.4	24597.5	-1•277	78•445	•016	-•256	39•578	25•509	•472
1178.0	320435.5	24598.5	-1•274	78•518	-•037	-•270	39•658	25•537	•496
1180.0	319369.0	24599.4	-1•271	78•590	-•115	-•289	39•711	25•563	•522
1182.0	318304.9	24600.4	-1•268	78•663	-•226	-•325	39•720	25•588	•549
1184.0	317243.3	24601.3	-1•264	78•736	-•358	-•383	39•705	25•611	•578
1186.0	316184.2	24602.1	-1•261	78•809	-•516	-•451	39•647	25•632	•607
1188.0	315127.6	24603.0	-1•258	78•882	-•703	-•548	39•625	25•653	•638
1190.0	314073.7	24603.9	-1•255	78•955	-•604	-•381	39•609	25•671	•671
1192.0	313022.3	24604.8	-1•252	79•029	-•509	-•214	39•564	25•688	•706
1194.0	311973.5	24605.6	-1•248	79•102	-•440	-•061	39•633	25•704	•741
1196.0	310927.4	24606.4	-1•245	79•175	-•403	•059	39•701	25•719	•780
1198.0	309894.0	24607.2	-1•242	79•249	-•407	•162	39•754	25•732	•820

OF POOR QUALITY

***** ST19BT USING FLAIR19, INERTIAL-BT19D19, NP0264 DYN. DATA. ***** PAGE 21 *****

TIME (SEC)	ALT& (FT)	VELA (FPS)	GAMA (DEG)	HDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
1200.0	308843.3	24607.9	-1.238	79.323	-0.470	•230	39.775	25.744	.861
1202.0	307805.5	24567.3	-1.237	79.788	-0.619	•639	39.792	25.711	.902
1204.0	306770.6	24571.0	-1.233	79.878	-0.844	.547	39.789	25.724	.948
1206.0	305738.6	24576.6	-1.229	79.963	-1.153	.243	39.777	25.738	.996
1208.0	304709.7	24584.1	-1.225	80.043	-1.236	.150	39.785	25.753	1.047
1210.0	303683.6	24593.6	-1.221	80.120	-1.314	.069	39.804	25.768	1.100
1212.0	302661.0	24605.4	-1.216	80.190	-1.416	-.030	39.820	25.786	1.155
1214.0	301641.3	24617.9	-1.212	80.260	-1.266	.111	39.884	25.803	1.214
1216.0	300624.8	24631.5	-1.207	80.329	-1.131	.228	39.953	25.821	1.275
1218.0	299611.6	24648.0	-1.202	80.393	-1.050	.317	40.050	25.841	1.339
1220.0	298601.6	24662.6	-1.198	80.460	-1.039	.351	40.166	25.858	1.406
1222.0	297595.0	24677.0	-1.193	80.528	-1.044	.376	40.321	25.875	1.477
1224.0	296591.9	24693.6	-1.188	80.597	-1.093	.375	40.506	25.893	1.550
1226.0	295592.3	24706.2	-1.183	80.666	-1.170	.345	40.744	25.906	1.626
1228.0	294546.4	24716.7	-1.178	80.735	-1.258	.284	41.025	25.992	1.717
1230.0	293604.3	24724.3	-1.173	80.811	-1.345	.236	41.243	26.107	1.818
1232.0	292616.2	24731.1	-1.168	80.879	-1.409	.196	41.374	26.216	1.924
1234.0	291632.2	24736.5	-1.162	80.944	-1.439	.155	41.389	26.320	2.036
1236.0	290652.5	24740.4	-1.157	81.005	-1.450	.116	41.361	26.418	2.154
1238.0	289677.1	24743.8	-1.151	81.060	-1.430	.072	41.268	26.512	2.278
1240.0	288706.2	24744.1	-1.146	81.117	-1.381	.052	41.133	26.598	2.408
1242.0	287740.0	24742.4	-1.140	81.174	-1.305	-.172	40.942	26.677	2.544
1244.0	286776.6	24734.1	-1.135	81.226	-.948	.180	40.692	26.746	2.686
1246.0	285822.1	24731.0	-1.129	81.284	-.475	-.106	40.368	26.815	2.836
1248.0	284870.7	24728.9	-1.123	81.344	-.044	-.010	39.967	26.882	2.993
1250.0	283924.7	24726.1	-1.117	81.406	-.580	.070	39.520	26.946	3.159
1252.0	282984.0	24731.5	-1.110	81.476	1.033	.203	39.208	27.010	3.334
1254.0	282049.0	24729.1	-1.103	81.535	1.184	.269	38.996	27.063	3.515
1256.0	281119.9	24725.0	-1.096	81.590	1.167	.200	38.949	27.111	3.704
1258.0	280197.1	24724.4	-1.088	81.644	.996	.024	39.042	27.158	3.903

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OF POOR QUALITY

***** ST193ET USING FLAIR19, INERTIAL-BT19019, NP0264 DYN. DATA. ***** PAGE 22 *

TIME (SEC)	ALTITUDE (FT)	VELA (FPS)	GAMA (DEG)	HOGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
1260.0	279280.9	24714.1	-1.081	81.691	.769	-.212	39.289	27.191	4.107
1262.0	278371.6	24698.8	-1.073	81.736	.573	-.357	39.717	27.214	4.317
1264.0	277464.7	24678.7	-1.065	81.776	.429	-.220	40.285	27.228	4.535
1266.0	276575.7	24642.7	-1.057	81.794	.210	-.180	40.858	27.221	4.754
1268.0	275690.0	24622.6	-1.047	81.843	.150	-.221	41.265	27.227	4.987
1270.0	274613.2	24605.5	-1.038	81.892	.632	-.349	41.309	27.233	5.230
1272.0	273945.2	24595.9	-1.027	81.953	-1.133	-.491	41.387	27.244	5.484
1274.0	273086.6	24583.2	-1.016	82.010	-1.557	-.558	41.138	27.248	5.746
1276.0	272236.2	24571.5	-1.005	82.068	-1.911	-.564	39.525	27.250	6.016
1278.0	271396.9	24560.2	-0.994	82.126	-2.183	-.518	39.201	27.249	6.294
1280.0	270569.5	24549.5	-0.983	82.188	-2.212	-.308	38.958	27.246	6.581
1282.0	269730.0	24538.8	-0.971	82.249	-2.055	-.159	38.963	27.241	6.876
1284.0	268940.9	24528.4	-0.959	82.312	-.902	-.632	39.174	27.232	7.180
1286.0	268142.6	24517.7	-0.947	82.376	-.566	-.015	39.747	27.221	7.490
1288.0	267355.7	24506.5	-0.933	82.441	-.252	-.267	40.179	27.207	7.808
1290.0	266581.0	24495.8	-0.919	82.507	1.04	-.314	40.304	27.191	8.133
1292.0	265818.5	24485.4	-0.905	82.576	.508	-.308	40.120	27.174	8.464
1294.0	265068.5	24475.2	-0.890	82.645	.854	-.118	39.828	27.155	8.802
1296.0	264331.2	24465.2	-0.875	82.716	.950	-.083	39.639	27.134	9.146
1298.0	263607.1	24455.0	-0.860	82.788	.853	-.222	39.490	27.111	9.494
1300.0	262896.4	24445.7	-0.844	82.862	.763	-.375	39.553	27.087	9.848
1302.0	262199.5	24436.6	-0.827	82.937	.827	-.308	39.838	27.063	10.207
1304.0	261517.0	24427.5	-0.810	83.013	.953	-.163	40.371	27.037	10.568
1306.0	260849.7	24418.5	-0.792	83.090	.979	-.144	40.895	27.010	10.933
1308.0	260198.0	24409.4	-0.773	83.170	.905	-.211	41.259	26.982	11.299
1310.0	259562.7	24400.3	-0.754	83.246	.838	-.294	41.457	26.954	11.666
1312.0	258944.3	24391.4	-0.734	83.328	.867	-.302	41.487	26.924	12.033
1314.0	258343.2	24382.6	-0.713	83.408	.961	-.253	41.379	26.895	12.398
1316.0	257759.6	24374.0	-0.693	83.489	.993	-.167	41.159	26.865	12.763
1318.0	257193.9	24366.0	-0.672	83.569	.918	-.182	40.783	26.838	13.125

***** ST19SET USING FLAIR19, INERTIAL-BT19D19, NPO264 DYN. DATA.
***** PAGE 23 *

TIME (SEC)	ALTITUDE (FT)	VELA (FPS)	GAMA (DEG)	HOGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
1320.0	2560646.4	24357.6	-650	83.650	.812	-215	40.243	26.806	13.483
1322.0	250117.6	24349.3	-626	83.733	.726	-234	39.707	26.776	13.836
1324.0	255607.5	24341.2	-606	83.816	.687	-212	39.279	26.746	14.185
1326.0	253110.4	24333.1	-583	83.899	.667	-170	39.151	26.716	14.527
1328.0	254644.6	24324.9	-560	83.984	.544	-117	39.211	26.687	14.861
1330.0	254192.4	24316.1	-537	84.069	-1.344	1.340	39.332	26.657	15.187
1332.0	253760.5	24307.2	-512	84.152	-6.472	.712	40.077	26.627	15.503
1334.0	253349.7	24297.7	-487	84.232	-12.550	.018	40.647	26.598	15.807
1336.0	252960.8	24297.6	-461	84.309	-18.520	.061	41.002	26.568	16.098
1338.0	252593.3	24277.4	-436	84.353	-24.450	-.046	41.067	26.539	16.376
1340.0	252246.7	24267.0	-412	84.454	-30.382	.030	40.863	26.511	16.641
1342.0	251920.0	24256.7	-389	84.523	-36.573	.042	40.461	26.483	16.893
1344.0	251611.7	24246.5	-369	84.589	-43.037	.031	39.923	26.457	17.134
1346.0	251320.0	24236.4	-350	84.652	-49.660	-.065	39.496	26.431	17.363
1348.0	251042.7	24226.3	-335	84.712	-55.976	-.490	39.288	26.405	17.583
1350.0	250777.4	24216.4	-321	84.771	-60.175	-.977	39.201	26.381	17.795
1352.0	250522.9	24206.1	-309	84.828	-62.398	-.469	39.210	26.356	17.999
1354.0	250278.4	24195.6	-298	84.885	-64.324	-.198	39.316	26.332	18.196
1356.0	250043.3	24185.0	-287	84.940	-66.321	-.202	39.502	26.307	18.386
1358.0	249816.0	24174.0	-277	84.995	-68.069	-.380	39.705	26.283	18.569
1360.0	249597.9	24162.9	-268	85.049	-69.365	-.339	39.874	26.256	18.747
1362.0	249386.4	24151.6	-260	85.103	-70.345	-.312	39.987	26.235	18.920
1364.0	249131.8	24140.1	-252	85.156	-71.193	-.231	40.030	26.211	19.187
1366.0	248983.7	24128.4	-245	85.208	-72.025	-.265	40.023	26.188	19.249
1368.0	248791.6	24116.7	-238	85.260	-72.547	-.327	39.982	26.164	19.406
1370.0	248605.1	24105.0	-231	85.312	-72.834	-.246	39.938	26.141	19.560
1372.0	248424.1	24093.2	-225	85.364	-73.088	-.194	39.906	26.118	19.709
1374.0	248248.4	24081.3	-218	85.415	-73.447	-.249	40.021	26.095	19.853
1376.0	248077.9	24069.1	-212	85.465	-73.689	-.248	40.254	26.072	19.994
1378.0	247812.3	24056.6	-206	85.515	-73.828	-.197	40.422	26.049	20.129

PAGE 15
ORIGINAL PAGE IS
OF POOR QUALITY

***** ST19BET USING FLAIR19, INERTIAL-BT1CD19, NP0264 DYN. DATA. *****

PAGE 24

TIME (SEC)	ALTITUDE (FT)	VFLA (FPS)	GAMA (DEG)	HGMA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
1360.0	247751.6	24043.9	-0.201	85.565	-73.970	-0.189	40.451	20.261	20.390
1382.0	247595.6	24032.0	-0.195	85.616	-74.087	-0.185	40.318	26.026	20.004
1384.0	247444.2	24019.2	-0.190	85.665	-74.188	-0.173	40.115	25.981	20.514
1386.0	247297.2	24006.6	-0.185	85.714	-74.461	-0.108	39.933	25.959	20.634
1388.0	247144.4	23994.0	-0.180	85.762	-74.906	-0.116	39.799	25.937	20.751
1390.0	247015.5	23981.4	-0.175	85.811	-75.647	-0.084	39.740	25.915	20.864
1392.0	246890.0	23968.7	-0.172	85.859	-76.565	-0.187	39.759	25.893	20.975
1394.0	246747.1	23955.8	-0.169	85.907	-77.372	-0.222	39.830	25.871	21.083
1396.0	246616.6	23942.9	-0.166	85.954	-78.031	-0.178	39.895	25.849	21.188
1398.0	246487.6	23929.7	-0.164	86.001	-78.568	-0.218	39.954	25.828	21.293
1400.0	246360.5	23916.5	-0.163	86.047	-78.922	-0.211	39.990	25.806	21.395
1402.0	246234.4	23903.1	-0.161	86.093	-79.233	-0.212	39.988	25.784	21.497
1404.0	246109.3	23889.6	-0.160	86.139	-79.560	-0.261	39.956	25.762	21.598
1406.0	245934.9	23876.1	-0.159	86.184	-79.754	-0.256	39.918	25.739	21.699
1408.0	245861.0	23862.5	-0.159	86.229	-79.807	-0.193	39.892	25.717	21.799
1410.0	245737.4	23848.9	-0.159	86.274	-79.867	-0.178	39.867	25.695	21.895
1412.0	245614.0	23835.2	-0.158	86.319	-79.967	-0.225	39.840	25.673	21.999
1414.0	245496.7	23821.4	-0.158	86.364	-79.973	-0.238	39.856	25.650	22.100
1416.0	245367.3	23807.5	-0.159	86.408	-79.840	-0.283	39.906	25.628	22.200
1418.0	245243.7	23793.4	-0.159	86.452	-79.425	-0.311	39.953	25.605	22.301
1420.0	245120.1	23779.3	-0.158	86.495	-78.842	-0.280	39.961	25.582	22.402
1422.0	244996.7	23765.2	-0.158	86.539	-78.199	-0.300	39.875	25.559	22.503
1424.0	244873.6	23751.1	-0.157	86.583	-77.576	-0.202	39.786	25.537	22.603
1426.0	244751.5	23737.0	-0.156	86.626	-77.110	-0.236	39.749	25.514	22.704
1428.0	244630.0	23722.9	-0.156	86.670	-76.572	-0.255	39.729	25.491	22.804
1430.0	244509.3	23708.8	-0.154	86.714	-75.977	-0.279	39.721	25.469	22.903
1432.0	244389.9	23695.3	-0.153	86.758	-75.430	-0.155	39.726	25.447	23.003
1434.0	244271.7	23681.1	-0.151	86.802	-75.182	-0.192	39.740	25.424	23.100
1436.0	244154.9	23666.7	-0.149	86.845	-74.902	-0.221	39.756	25.401	23.195
1438.0	244039.5	23652.3	-0.148	86.887	-74.526	-0.220	39.761	25.379	23.290

OF POOR QUALITY

***** ST19BET USING FLAIR19, INERTIAL-BT19019, NP0264 DYN. DATA.
***** PAGE 25 *****

TIME (SEC)	ALTDE (FT) (FPS)	VELA (FPS)	GAMA (DEG)	HDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
1440.0	243925.6	23637.8	-146	86.930	-74.131	-0.232	39.768	25.356	23.383
1442.0	243613.2	23623.1	-144	86.973	-73.799	-0.157	39.772	25.333	23.474
1444.0	243702.6	23608.4	-142	87.015	-73.615	-0.178	39.732	25.310	23.563
1446.0	243593.6	23593.7	-140	87.057	-73.379	-0.179	39.667	25.288	23.651
1448.0	243486.3	23578.9	-137	87.099	-73.089	-0.136	39.583	25.265	23.737
1450.0	243330.8	23564.2	-135	87.141	-72.902	-0.096	39.546	25.243	23.821
1452.0	243276.9	23549.4	-133	87.162	-72.764	-0.092	39.532	25.220	23.904
1454.0	243176.6	23534.6	-131	87.224	-72.640	-0.095	39.534	25.198	23.985
1456.0	243073.9	23519.6	-129	87.265	-72.529	-0.080	39.543	25.175	24.064
1458.0	242974.8	23504.6	-127	87.306	-72.439	-0.066	39.559	25.153	24.141
1460.0	242877.2	23489.5	-126	87.347	-72.370	-0.043	39.564	25.130	24.217
1462.0	242731.1	23474.3	-124	87.387	-72.352	-0.034	39.554	25.108	24.291
1464.0	242636.3	23459.0	-122	87.428	-72.415	-0.041	39.534	25.086	24.364
1466.0	242592.7	23443.8	-121	87.468	-72.534	-0.061	39.519	25.063	24.435
1468.0	242500.1	23428.5	-120	87.508	-72.655	-0.047	39.513	25.041	24.506
1470.0	242406.2	23413.3	-119	87.548	-72.786	-0.034	39.529	25.019	24.576
1472.0	242316.7	23398.3	-119	87.589	-73.010	-0.048	39.542	24.997	24.646
1474.0	242225.3	23383.2	-119	87.629	-73.282	-0.078	39.540	24.975	24.716
1476.0	242133.8	23368.1	-119	87.669	-73.510	-0.047	39.532	24.953	24.786
1478.0	242041.6	23353.0	-120	87.709	-73.772	-0.016	39.537	24.931	24.856
1480.0	241948.9	23337.6	-121	87.749	-73.968	-0.128	39.563	24.909	24.928
1482.0	241855.2	23322.4	-122	87.788	-73.903	-0.034	39.579	24.886	25.000
1484.0	241760.5	23307.1	-123	87.827	-73.964	-0.023	39.578	24.864	25.073
1486.0	241664.8	23291.7	-125	87.866	-74.136	-0.060	39.566	24.841	25.148
1488.0	241567.5	23276.5	-127	87.906	-74.284	-0.054	39.531	24.819	25.225
1490.0	241468.6	23261.2	-129	87.944	-74.472	-0.054	39.526	24.796	25.304
1492.0	241367.8	23245.8	-131	87.983	-74.607	-0.164	39.612	24.773	25.384
1494.0	241264.6	23230.4	-134	88.022	-74.395	-0.158	39.662	24.750	25.468
1496.0	241159.7	23214.9	-137	86.060	-73.953	-0.155	39.738	24.727	25.554
1498.0	241052.6	23200.2	-139	88.101	-73.507	-0.148	39.802	24.704	25.644

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ST193E1 USING FLAIR19, INERTIAL-BT19D19, NP0264 DYN. DATA.

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TIME (SEC)	ALT& (FT)	VELA (FPS)	GAMA (DEG)	HOGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
1500.0	240943.6	23134.7	-141	88.140	-73.073	-147	39.835	24.680	25.734
1502.0	240832.9	23169.1	-143	86.178	-72.608	-141	39.861	24.656	25.827
1504.0	240720.7	23153.4	-145	88.216	-72.112	-112	39.901	24.632	25.921
1506.0	240607.1	23137.4	-146	88.254	-71.628	-091	39.956	24.608	26.016
1508.0	240492.5	23121.2	-147	88.291	-71.165	-090	39.998	24.583	26.112
1510.0	240377.0	23104.9	-149	88.329	-70.701	-082	40.027	24.558	26.210
1512.0	240260.8	23088.7	-149	88.366	-70.281	-086	40.017	24.534	26.308
1514.0	240144.0	23072.4	-150	88.403	-69.908	-099	39.985	24.508	26.407
1516.0	240026.7	23055.9	-151	88.440	-69.541	-099	39.954	24.483	26.507
1518.0	239909.0	23039.5	-151	88.477	-69.157	-080	39.950	24.458	26.607
1520.0	239791.0	23023.0	-151	88.514	-68.826	-058	39.963	24.433	26.708
1522.0	239672.8	23006.4	-152	88.551	-68.523	-025	39.997	24.407	26.809
1524.0	239554.5	22989.8	-152	88.588	-68.284	-010	40.032	24.382	26.911
1526.0	239435.9	22973.1	-152	88.624	-68.120	-005	40.061	24.356	27.012
1528.0	239317.3	22956.3	-152	88.660	-67.999	-021	40.073	24.331	27.114
1530.0	239198.5	22939.4	-152	88.696	-67.965	-038	40.045	24.305	27.216
1532.0	239079.4	22922.6	-153	88.732	-68.038	-038	40.030	24.279	27.319
1534.0	238959.8	22905.6	-154	88.768	-68.222	-018	40.025	24.253	27.422
1536.0	238839.6	22888.5	-155	88.803	-68.492	-005	40.043	24.227	27.526
1538.0	238718.4	22871.3	-156	88.837	-68.765	-077	40.072	24.201	27.631
1540.0	238596.1	22854.0	-158	88.872	-68.931	-027	40.098	24.175	27.737
1542.0	238472.4	22836.7	-160	88.906	-69.139	-035	40.099	24.148	27.845
1544.0	238346.8	22819.5	-162	88.940	-69.322	-032	40.098	24.122	27.956
1546.0	238219.2	22802.3	-165	88.974	-69.555	-075	40.081	24.095	28.070
1548.0	238039.2	22785.1	-168	89.008	-69.599	-123	40.085	24.068	28.187
1550.0	237956.7	22767.7	-171	89.042	-69.453	-068	40.095	24.041	28.307
1552.0	237821.6	22750.1	-175	89.076	-69.151	-068	40.136	24.013	28.430
1554.0	237634.0	22732.7	-178	89.110	-68.866	-057	40.139	23.986	28.557
1556.0	237543.9	22715.2	-181	89.143	-66.655	-103	40.133	23.958	28.687
1558.0	237401.3	22697.6	-184	89.177	-68.410	-115	40.195	23.930	28.820

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***** ST19SET USING FLAIR19, INERTIAL-BT19019, NPO264 DYN. DATA. ***** PAGE 27 *****

TIME (SEC)	ALTDE (FT)	VELA (FPS)	GAMA (DEG)	HDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
1560.0	237256.5	22679.9	-187	89.209	-68.096	-0.087	40.285	23.901	28.956
1562.0	237109.4	22662.0	-190	89.242	-67.861	-0.112	40.333	23.873	29.095
1564.0	236900.1	22644.0	-193	89.274	-67.627	-0.154	40.334	23.844	29.236
1566.0	23688.6	22625.9	-195	89.306	-67.292	-0.131	40.309	23.815	29.381
1568.0	236655.1	22607.8	-198	89.338	-66.951	-0.126	40.286	23.785	29.529
1570.0	236499.6	22589.6	-201	89.370	-66.592	-0.126	40.285	23.756	29.680
1572.0	236342.3	22571.3	-203	89.402	-66.214	-0.154	40.310	23.726	29.833
1574.0	236133.2	22552.9	-205	89.433	-65.766	-0.168	40.329	23.696	29.988
1576.0	236022.6	22534.4	-207	89.464	-65.221	-0.155	40.347	23.666	30.146
1578.0	235860.6	22515.9	-209	89.496	-64.609	-0.118	40.353	23.635	30.306
1580.0	235697.5	22497.3	-210	89.527	-63.930	-0.082	40.359	23.605	30.468
1582.0	235533.6	22473.6	-211	89.559	-63.364	-0.118	40.352	23.574	30.631
1584.0	235369.2	22459.6	-211	89.590	-62.957	-0.114	40.340	23.543	30.795
1586.0	235204.5	22440.9	-212	89.621	-62.488	-0.046	40.344	23.512	30.960
1588.0	235039.7	22421.9	-212	89.651	-62.259	-0.028	40.365	23.481	31.125
1590.0	234874.8	22402.8	-212	89.682	-62.060	-0.043	40.374	23.450	31.291
1592.0	234709.9	22383.3	-212	89.711	-61.758	-0.004	40.373	23.419	31.456
1594.0	234545.3	22363.5	-212	89.739	-61.461	-0.034	40.376	23.387	31.620
1596.0	234381.3	22343.8	-211	89.768	-61.175	-0.064	40.377	23.355	31.785
1598.0	234217.8	22323.9	-210	89.797	-60.983	-0.015	40.380	23.323	31.948
1600.0	234055.0	22303.9	-210	89.825	-60.730	-0.036	40.388	23.291	32.111
1602.0	233892.9	22283.7	-209	89.854	-60.444	-0.076	40.403	23.259	32.273
1604.0	233731.5	22263.5	-208	89.882	-60.248	-0.060	40.410	23.227	32.434
1606.0	233570.9	22243.5	-207	89.910	-60.065	-0.068	40.394	23.196	32.595
1608.0	233410.8	22223.4	-207	89.938	-60.267	-0.127	40.395	23.164	32.756
1610.0	233251.1	22203.0	-206	89.966	-60.728	-0.054	40.398	23.132	32.916
1612.0	233091.5	22182.4	-207	89.992	-61.150	-0.051	40.401	23.100	33.076
1614.0	232931.8	22161.6	-207	90.018	-61.472	-0.002	40.420	23.067	33.235
1616.0	232771.5	22140.7	-208	90.043	-61.638	-0.030	40.437	23.035	33.396
1618.0	232610.6	22119.7	-209	90.068	-61.819	-0.059	40.391	23.002	33.557

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 * ST19BETT USING FLAIR19, INERTIAL-BT19019, NP0264 DYN. DATA.

PAGE

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		TIME (SEC)	ALTDE (FT)	VELA (FPS)	GAMA (DEG)	HOGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
1620.0	232448.8	22098.7	-.211	90.093	-62.088	.030	40.356	22.969	33.720		
1622.0	232285.8	22077.5	-.212	90.117	-62.138	-.003	40.385	22.936	33.885		
1624.0	232121.5	22056.1	-.214	90.140	-62.033	.080	40.422	22.903	34.051		
1626.0	231956.1	22034.5	-.216	90.163	-62.077	.044	40.405	22.869	34.219		
1628.0	231789.4	22012.9	-.218	90.185	-61.968	-.034	40.333	22.835	34.389		
1630.0	231624.3	21991.2	-.220	90.208	-61.613	.013	40.208	22.802	34.562		
1632.0	231451.9	21969.5	-.221	90.230	-61.308	.006	40.120	22.768	34.736		
1634.0	231281.5	21946.2	-.223	90.249	-60.962	.014	40.135	22.732	34.908		
1636.0	231110.3	21924.2	-.224	90.270	-60.601	.002	40.182	22.698	35.085		
1638.0	230936.4	21902.0	-.225	90.292	-60.173	-.002	40.103	22.663	35.263		
1640.0	230765.9	21880.1	-.226	90.313	-59.649	-.013	39.998	22.629	35.443		
1642.0	230593.0	21858.2	-.226	90.335	-59.058	-.012	39.994	22.595	35.625		
1644.0	230420.1	21836.1	-.226	90.357	-58.426	.077	40.046	22.560	35.806		
1646.0	230247.4	21813.9	-.226	90.379	-57.866	.089	40.058	22.526	35.988		
1648.0	230072.2	21791.8	-.225	90.401	-57.504	.091	40.031	22.491	36.169		
1650.0	229903.6	21769.7	-.225	90.424	-57.349	.108	40.026	22.457	36.350		
1652.0	229732.5	21747.5	-.224	90.446	-57.401	.119	40.009	22.423	36.531		
1654.0	229562.1	21724.6	-.223	90.467	-57.518	.108	40.005	22.388	36.709		
1656.0	229392.5	21701.9	-.222	90.486	-57.641	.104	40.012	22.353	36.886		
1658.0	229223.7	21678.8	-.222	90.506	-57.783	.102	40.025	22.318	37.061		
1660.0	229055.5	21655.5	-.221	90.524	-57.977	.087	39.969	22.282	37.235		
1662.0	228887.8	21632.5	-.221	90.543	-58.278	.014	39.850	22.248	37.410		
1664.0	228719.7	21609.6	-.222	90.562	-58.454	.016	39.811	22.213	37.586		
1666.0	228551.2	21586.5	-.223	90.580	-58.540	.061	39.855	22.178	37.763		
1668.0	228382.2	21563.2	-.224	90.597	-58.678	.055	39.916	22.143	37.940		
1670.0	228212.5	21539.9	-.225	90.614	-58.839	.052	39.904	22.107	38.119		
1672.0	228041.8	21516.4	-.226	90.631	-58.965	.050	39.880	22.072	38.299		
1674.0	227870.2	21491.5	-.228	90.648	-59.103	.043	39.875	22.035	38.475		
1676.0	227697.3	21467.9	-.230	90.664	-59.193	-.015	39.883	21.999	38.659		
1678.0	227522.7	21444.5	-.233	90.680	-58.999	-.022	39.892	21.954	38.846		

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* ST198ET USING FLAIR19, INERTIAL-BT19019, NP0264 DYN. DATA.
***** PAGE 29

TIME (SEC)	ALTITUDE (FT) (FPS)	VELA (FPS)	GAMA (DEG) (JEG)	HOGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
1600.0	227346.4	21421.2	-0.236	90.696	-58.723	-0.005	39.870	21.928	39.036
16d2.0	227165.3	21397.9	-0.238	90.712	-58.412	.015	39.876	21.892	39.232
1664.0	226988.6	21374.4	-0.240	90.728	-58.086	.027	40.010	21.857	39.428
16R6.0	226807.7	21350.4	-0.242	90.742	-57.761	.042	40.144	21.820	39.626
1688.0	226626.1	21326.3	-0.243	90.757	-57.453	.040	40.126	21.783	39.824
1640.0	226443.7	21302.2	-0.244	90.771	-57.148	.045	40.099	21.747	40.024
1642.0	226260.7	21276.0	-0.245	90.785	-56.853	.053	40.101	21.710	40.226
1694.0	226077.2	21254.1	-0.246	90.800	-56.578	.049	40.102	21.674	40.429
1696.0	225893.1	21230.3	-0.247	90.815	-56.594	.095	40.109	21.637	40.635
1648.0	225707.9	21206.5	-0.249	90.830	-56.939	.061	40.198	21.601	40.844
1700.0	225521.3	21182.4	-0.251	90.843	-57.471	.056	40.374	21.564	41.053
1702.0	225333.2	21157.0	-0.254	90.855	-57.999	.052	40.507	21.527	41.264
1704.0	225143.1	21133.3	-0.257	90.867	-58.447	.020	40.527	21.490	41.479
1706.0	224950.4	21108.3	-0.262	90.878	-58.859	.010	40.512	21.452	41.699
1708.0	224754.7	21084.1	-0.266	90.888	-59.256	.002	40.503	21.414	41.924
1710.0	224555.7	21060.2	-0.271	90.899	-59.622	-.083	40.525	21.377	42.158
1712.0	224353.0	21035.5	-0.277	90.908	-59.534	-.063	40.683	21.339	42.395
1714.0	224146.6	21009.8	-0.281	90.915	-59.293	.026	41.311	21.299	42.636
1716.0	223937.2	20984.2	-0.286	90.923	-59.127	.038	41.285	21.260	42.882
1718.0	223724.9	20957.8	-0.290	90.928	-59.044	.020	40.664	21.220	43.132
1720.0	223509.0	20933.8	-0.296	90.938	-58.969	-.046	39.929	21.181	43.398
1722.0	223286.6	20909.5	-0.302	90.946	-58.518	.148	40.066	21.143	43.671
1724.0	223065.0	20884.7	-0.307	90.954	-58.466	-.232	40.225	21.103	43.949
1726.0	222837.7	20860.0	-0.313	90.961	-58.602	-.123	40.404	21.064	44.235
1728.0	222606.3	20834.6	-0.319	90.966	-58.496	-.049	40.612	21.023	44.525
1730.0	222371.5	20808.7	-0.323	90.971	-57.610	-.027	40.779	20.982	44.821
1732.0	222134.4	20781.9	-0.325	90.974	-56.628	-.006	40.973	20.940	45.118
1734.0	221896.3	20754.8	-0.327	90.977	-55.419	-.039	40.991	20.898	45.416
1736.0	221658.1	20727.7	-0.326	90.981	-53.830	.005	40.759	20.856	45.716
1738.0	221421.2	20701.8	-0.324	90.989	-52.575	.065	40.547	20.815	46.021

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PAGE
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***** ST19RET USING FLAIR19, INERTIAL-B119D19, NP0264 DYN. DATA. *****

PAGE 30

TIME (SEC)	ALTDE (FT)	VELA (FPS)	GAMA (DEG)	HGDA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
1740.0	221166.3	20675.2	-322	90.995	-51.871	.073	40.391	20.773	46.319
1742.0	220953.6	20643.7	-319	91.001	-51.390	.035	40.265	20.732	46.616
1744.0	220723.4	20622.1	-315	91.006	-51.267	.124	40.213	20.691	46.908
1746.0	220496.1	20595.1	-312	91.010	-51.484	.091	40.225	20.649	47.194
1748.0	220271.4	20567.9	-309	91.013	-51.629	.094	40.181	20.608	47.476
1750.0	220044.2	20540.6	-306	91.015	-51.770	.100	40.078	20.567	47.754
1752.0	219829.0	20513.8	-304	91.018	-51.901	.118	40.044	20.526	48.031
1754.0	219610.5	20486.6	-302	91.019	-52.229	.164	40.116	20.486	48.304
1756.0	219393.8	20458.6	-300	91.019	-52.667	.185	40.163	20.445	48.572
1758.0	219178.7	20430.7	-298	91.017	-53.168	.139	40.164	20.403	48.836
1760.0	218964.7	20402.8	-298	91.015	-53.480	.090	40.081	20.362	49.099
1762.0	218751.0	20375.2	-298	91.012	-53.720	.088	39.974	20.322	49.365
1764.0	218537.1	20347.3	-299	91.009	-53.893	.109	39.978	20.281	49.630
1766.0	216323.0	20319.4	-300	91.004	-54.062	.134	40.043	20.240	49.896
1768.0	218106.5	20293.1	-301	90.993	-54.238	.145	40.052	20.201	50.171
1770.0	217693.8	20264.2	-301	90.986	-54.440	.153	40.027	20.159	50.435
1772.0	217078.9	20235.1	-302	90.978	-54.753	.091	40.011	20.117	50.698
1774.0	217463.4	20205.8	-304	90.969	-54.975	.023	39.965	20.075	50.963
1776.0	217247.0	20176.3	-306	90.960	-55.103	-.002	39.900	20.033	51.228
1778.0	217029.4	20147.0	-308	90.950	-55.195	-.028	39.912	19.991	51.498
1780.0	216810.2	20117.3	-311	90.940	-55.132	.001	39.942	19.948	51.769
1782.0	216589.3	20087.3	-314	90.930	-55.004	.015	39.962	19.906	52.045
1784.0	216366.7	20057.6	-317	90.919	-54.827	.013	39.950	19.863	52.322
1786.0	216143.0	20027.0	-319	90.906	-54.700	-.034	39.980	19.819	52.600
1788.0	215916.2	19996.2	-321	90.894	-54.585	-.061	39.995	19.776	52.879
1790.0	215692.2	19965.3	-323	90.881	-54.430	-.054	39.991	19.732	53.160
1792.0	215465.2	19934.2	-325	90.867	-54.288	-.066	39.969	19.688	53.443
1794.0	215237.2	19902.8	-327	90.854	-54.171	-.069	39.969	19.644	53.728
1796.0	215003.1	19871.3	-329	90.840	-54.160	-.121	39.995	19.599	54.014
1798.0	214777.7	19840.2	-332	90.824	-54.132	-.163	40.021	19.555	54.306

 * ST 190 ET USING FLAIR 19, INERTIAL-BT19019, NP0264 DYN. DATA.
 * PAGE 31

TIME (SEC)	ALTDE (FT)	VELA (FPS)	GAMA (DEG)	HDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	OA (PSF)
1600.0	214546.3	19807.7	-0.333	90.808	-54.030	-0.151	39.991	19.510	54.593
1602.0	214314.6	17774.3	-0.333	90.789	-54.044	-0.178	39.966	19.464	54.876
1804.0	214083.2	19740.5	-0.334	90.770	-53.995	-0.288	39.898	19.418	55.157
1806.0	213851.7	17070.1	-0.335	90.751	-53.508	-0.336	39.737	19.371	55.441
1808.0	213620.7	19672.7	-0.333	90.730	-52.990	-0.204	39.643	19.325	55.719
1810.0	213392.1	19637.3	-0.330	90.707	-52.719	-0.250	39.582	19.277	55.986
1612.0	213166.1	19602.0	-0.326	90.664	-51.513	-0.386	39.347	19.230	56.249
1814.0	212943.8	19567.1	-0.320	90.664	-50.195	-0.195	39.054	19.183	56.507
1816.0	212725.9	19532.6	-0.314	90.645	-49.769	-0.156	38.911	19.137	56.759
1818.0	212512.8	19497.6	-0.308	90.625	-50.124	-0.108	38.887	19.091	56.998
1820.0	212304.5	19462.3	-0.302	90.604	-50.798	-0.157	38.864	19.045	57.225
1822.0	212099.8	19427.2	-0.298	90.562	-51.363	-0.226	38.825	18.999	57.446
1824.0	211637.8	17392.1	-0.295	90.559	-51.816	-0.231	38.786	18.954	57.661
1826.0	211697.7	19357.2	-0.294	90.536	-52.276	-0.231	38.580	18.909	57.873
1828.0	211498.3	19321.5	-0.294	90.515	-52.866	-0.181	38.579	18.863	58.079
1830.0	211298.8	19286.5	-0.295	90.490	-53.685	-0.183	38.800	18.818	58.289
1832.0	211098.6	19250.7	-0.298	90.462	-54.546	-0.163	38.996	18.773	58.496
1834.0	210897.0	19214.4	-0.301	90.433	-55.399	-0.239	39.156	18.727	58.704
1836.0	210692.6	19177.8	-0.306	90.402	-55.897	-0.240	39.284	18.680	58.914
1838.0	210485.7	19140.7	-0.312	90.370	-56.382	-0.251	39.399	18.633	59.127
1840.0	210275.0	19103.2	-0.318	90.336	-56.858	-0.270	39.481	18.585	59.345
1842.0	210060.5	19065.0	-0.325	90.300	-57.240	-0.259	39.492	18.537	59.568
1844.0	209842.2	19026.0	-0.331	90.261	-57.308	-0.273	39.516	18.487	59.792
1846.0	209620.4	18986.2	-0.336	90.220	-56.317	-0.335	39.480	18.437	60.020
1848.0	209396.3	18947.1	-0.340	90.183	-54.827	-0.225	39.289	18.388	60.257
1850.0	209170.5	18908.6	-0.343	90.148	-54.082	-0.129	39.214	18.339	60.501
1852.0	208943.5	18870.0	-0.346	90.112	-54.095	-0.263	39.326	18.290	60.747
1854.0	208714.8	18830.4	-0.347	90.076	-51.101	-0.143	39.528	18.239	60.990
1856.0	208489.3	18790.0	-0.340	90.043	-50.417	-0.364	39.516	18.189	61.221
1858.0	208267.7	18746.8	-0.336	90.009	-50.951	-0.179	39.439	18.136	61.425

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ST193ET USING FLAIR19, INERTIAL-BT19D19, NP0264 DYN. DATA.

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TIME (SEC)	ALTUE (FT)	VELA (FPS)	GAMA (DEG)	HGDA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
1d60.0	205049.8	19705.5	-330	89.972	-49.566	-328	39.492	18.085	61.633
1862.0	207537.3	13663.4	-321	89.935	-49.042	-158	40.474	18.034	61.823
1d64.0	207632.2	13620.1	-310	89.895	-48.778	-139	39.290	17.982	61.988
1366.0	207432.8	13580.6	-304	89.861	-46.595	-203	38.676	17.934	62.166
1868.0	207238.5	18540.2	-295	89.825	-48.257	-134	39.402	17.885	62.325
1370.0	207051.5	19498.3	-286	89.787	-50.849	-317	39.827	17.835	62.458
1372.0	206868.0	18456.6	-286	89.742	-54.002	-226	39.724	17.786	62.583
1374.0	206633.5	18415.4	-290	89.695	-55.895	-214	39.551	17.738	62.715
1376.0	206495.0	18374.7	-299	89.646	-57.776	-249	39.592	17.694	62.889
1378.0	206299.7	16333.7	-313	89.593	-59.579	-291	39.710	17.650	63.077
1380.0	206095.6	18291.8	-329	89.536	-60.852	-357	39.853	17.604	63.280
1382.0	205881.1	18249.2	-347	89.476	-61.377	-368	39.958	17.558	63.504
1384.0	205655.9	18206.1	-364	89.414	-61.445	-326	40.032	17.512	63.749
1386.0	205420.0	13162.5	-382	89.351	-61.285	-279	40.046	17.464	64.018
1388.0	205173.5	18118.7	-400	89.286	-61.044	-301	40.054	17.416	64.312
1390.0	204916.7	18073.4	-417	89.213	-60.621	-329	40.064	17.367	64.621
1392.0	204650.2	18029.0	-433	89.147	-59.915	-278	40.081	17.318	64.962
1394.0	204374.9	17984.7	-448	89.062	-59.480	-245	40.088	17.270	65.325
1396.0	204091.0	17940.4	-463	89.017	-59.034	-257	40.125	17.221	65.712
1398.0	203799.3	17895.2	-475	88.949	-58.776	-154	40.243	17.171	66.113
1400.0	203500.7	17849.6	-488	88.881	-58.800	-166	40.279	17.121	66.531
1402.0	203195.2	17803.7	-500	88.811	-58.771	-158	40.280	17.071	66.966
1404.0	202882.7	17757.7	-513	88.741	-58.802	-200	40.280	17.020	67.419
1406.0	202563.4	17711.2	-525	88.669	-58.780	-220	40.293	16.969	67.890
1408.0	202237.6	17664.1	-537	88.594	-58.583	-304	40.293	16.918	68.375
1410.0	20195.9	17616.9	-548	88.519	-57.773	-312	40.237	16.866	68.877
1412.0	201569.4	17570.0	-556	88.439	-56.680	-246	40.141	16.815	69.396
1414.0	201229.0	17522.9	-562	88.366	-55.960	-187	40.137	16.763	69.926
1416.0	200887.7	17475.4	-566	88.294	-55.606	-194	40.155	16.711	70.462
1418.0	200544.4	17427.8	-570	88.222	-55.146	-194	40.155	16.660	71.004

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***** ST19BET USING FLAIR19, INERTIAL-8T19019, NPO264 DYN. DATA. PAGE 33 *****

TIME (SEC)	ALT&E (FT)	VELA (FPS)	GAMA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
1920.0	200200.4	17380.0	-572	88.150	-54.740	.148	40.168	16.608
1922.0	199856.3	17332.0	-574	88.079	-54.405	.124	40.167	16.556
1924.0	199512.6	17284.1	-575	88.008	-54.355	.097	40.174	16.504
1926.0	199169.2	17236.0	-576	87.937	-54.455	.057	40.162	16.453
1928.0	198826.3	17187.5	-577	87.865	-54.800	.037	40.180	16.401
1930.0	198483.6	17139.4	-579	87.796	-55.316	.056	40.183	16.349
1932.0	198140.1	17090.9	-583	87.722	-55.881	.108	40.197	16.298
1934.0	197794.7	17042.3	-589	87.647	-56.158	.065	40.213	16.246
1936.0	197446.9	16993.6	-595	87.572	-56.507	.041	40.245	16.194
1938.0	197096.4	16944.2	-602	87.493	-56.942	.036	40.328	16.142
1940.0	196743.2	16894.0	-609	87.412	-57.433	.066	40.393	16.089
1942.0	196386.6	16843.4	-617	87.329	-57.783	.089	40.390	16.036
1944.0	196026.6	16792.2	-625	87.244	-57.804	.074	40.370	15.982
1946.0	195664.3	16739.7	-630	87.154	-57.489	.101	40.328	15.927
1948.0	195300.7	16686.7	-632	87.064	-55.967	.189	40.207	15.872
1950.0	194938.7	16635.0	-629	86.996	-53.716	.084	39.989	15.818
1952.0	194581.7	16582.7	-620	86.912	-52.553	.015	39.818	15.764
1954.0	194231.2	16530.8	-611	86.828	-52.320	.036	39.697	15.710
1956.0	193887.1	16479.0	-603	86.743	-52.658	.004	39.649	15.656
1958.0	193548.1	16427.9	-598	86.656	-53.633	.016	39.663	15.604
1960.0	193212.0	16376.1	-596	86.563	-54.924	.049	39.757	15.551
1962.0	192877.8	16323.0	-596	86.462	-56.514	.045	39.887	15.496
1964.0	192543.3	16269.4	-601	86.356	-57.517	.008	39.950	15.442
1966.0	192206.9	16215.5	-608	86.247	-57.995	.017	39.925	15.387
1968.0	191867.7	16163.5	-615	86.136	-58.399	.043	39.917	15.334
1970.0	191525.2	16108.9	-624	86.020	-58.738	.050	39.963	15.279
1972.0	191178.8	16053.6	-634	85.900	-59.034	.037	39.994	15.223
1974.0	190827.9	15997.9	-645	85.777	-59.199	.063	40.003	15.167
1976.0	190472.5	15941.4	-656	85.650	-59.318	.049	40.039	15.110
1978.0	190112.4	15884.5	-667	85.521	-59.360	.056	40.057	15.053

***** ST198ET USING FLAIR19, INERTIAL-BT19D19, NP0264 DYN. DATA. PAGE 34 *****

TIME (SEC)	ALT DE (FT)	VELA (FPS)	GAMA (DEG)	HOGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
1980.0	189747.5	15626.8	-678	85.387	-59.305	.088	40.032	14.995	88.583
1982.0	189376.9	12767.6	-686	85.247	-59.277	.085	40.052	14.935	89.178
1984.0	189007.4	13707.4	-694	85.101	-58.826	-.059	40.017	14.875	89.775
1986.0	188634.0	15645.8	-699	84.944	-57.528	-.070	39.844	14.814	90.364
1988.0	188261.5	15585.0	-697	84.798	-56.068	.047	39.708	14.753	90.960
1990.0	187892.8	15523.7	-691	84.651	-55.375	.021	39.635	14.692	91.540
1992.0	187529.4	15462.5	-684	84.505	-54.725	.060	39.539	14.632	92.101
1994.0	187172.1	15401.2	-675	84.358	-54.423	.075	39.413	14.571	92.643
1996.0	186821.5	15339.7	-666	84.209	-54.665	.052	39.384	14.511	93.157
1998.0	186477.1	15277.9	-658	84.058	-54.979	.088	39.361	14.450	93.646
2000.0	186137.9	15216.0	-652	83.903	-55.634	.074	39.336	14.389	94.116
2002.0	185802.7	15153.9	-649	83.745	-56.338	.091	39.355	14.328	94.567
2004.0	185466.9	15091.6	-649	83.584	-57.187	.091	39.390	14.267	95.006
2006.0	185137.4	15027.4	-654	83.414	-58.233	.077	39.439	14.205	95.421
2008.0	184803.0	14964.6	-663	83.245	-59.379	.081	39.524	14.143	95.858
2010.0	184464.3	14901.2	-677	83.070	-60.617	.124	39.696	14.082	96.303
2012.0	184119.1	14837.1	-695	82.890	-62.097	.128	39.864	14.019	96.764
2014.0	183756.9	14772.5	-722	82.705	-63.267	-.045	40.066	13.957	97.253
2016.0	183396.5	14706.8	-748	82.515	-62.489	.042	40.246	13.893	97.774
2018.0	183016.9	14640.4	-769	82.326	-61.312	.057	40.349	13.828	98.324
2020.0	182633.7	14573.7	-785	82.137	-59.749	.067	40.373	13.764	98.899
2022.0	182244.3	14506.7	-794	81.951	-57.877	.118	40.353	13.699	99.486
2024.0	181854.8	14437.2	-794	81.762	-56.107	.162	40.614	13.632	100.038
2026.0	181469.3	14369.0	-787	81.580	-54.177	.065	40.651	13.566	100.593
2028.0	181091.6	14301.2	-770	81.405	-51.524	.114	40.478	13.501	101.123
2030.0	180726.8	14234.2	-744	81.238	-49.577	.201	40.308	13.436	101.611
2032.0	180376.0	14167.8	-714	81.075	-48.800	.262	40.165	13.372	102.043
2034.0	180046.3	14102.2	-683	80.912	-48.722	.227	39.997	13.310	102.417
2036.0	179730.6	14037.2	-655	80.750	-49.174	.266	39.913	13.247	102.731
2038.0	179430.2	13972.5	-629	80.584	-50.119	.327	39.882	13.185	102.987

* J T19BET USING FLAIR19, INERTIAL-8T14D19, NP0264 DYN. DATA.

TIME (SEC)	ALTOE (FT)	VELA (FPS)	GAMA (DEG)	HDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
2040.0	179142.5	13907.6	-609	80.412	-51.563	.282	39.835	13.124	103.186
2042.0	176864.3	13843.1	-597	80.234	-52.381	-.075	39.825	13.062	103.348
2044.0	176593.0	13779.3	-581	80.070	-46.952	-.260	39.887	13.001	103.490
2046.0	178338.9	13714.3	-530	79.925	-37.167	.245	39.872	12.940	103.540
2048.0	178118.4	13649.5	-448	79.819	-27.675	.172	39.777	12.876	103.452
2050.0	177943.6	13584.8	-344	79.757	-18.129	.149	39.722	12.817	103.177
2052.0	177622.4	13520.1	-226	79.741	-8.653	.106	39.704	12.755	102.682
2054.0	177759.1	13455.3	-102	79.772	.823	.049	39.667	12.694	101.952
2056.0	177754.0	13390.6	020	79.853	10.376	.003	39.682	12.633	101.012
2058.0	177803.0	13326.1	129	79.983	20.064	-.036	39.708	12.572	100.042
2060.0	177697.6	13262.1	218	80.160	29.918	-.043	39.774	12.512	99.084
2062.0	178026.6	13198.5	278	80.382	39.955	-.043	39.867	12.452	98.136
2064.0	176173.6	13135.3	301	80.642	50.230	-.022	39.998	12.392	97.198
2066.0	176320.7	13072.5	280	80.936	60.610	-.027	40.177	12.333	96.270
2068.0	176445.8	13009.9	209	81.254	70.299	.151	40.397	12.274	95.350
2070.0	178527.5	12947.8	098	81.565	74.834	.209	40.491	12.215	94.442
2072.0	178555.4	12886.2	024	81.917	76.569	.001	40.640	12.157	93.545
2074.0	178525.7	12824.5	156	82.252	77.672	.011	40.915	12.099	92.652
2076.0	178435.9	12762.4	292	82.568	78.125	.045	41.418	12.040	91.757
2078.0	178284.9	12699.0	430	82.927	77.852	.067	41.854	11.981	90.847
2080.0	178073.6	12635.1	566	83.266	76.585	.079	42.046	11.920	89.936
2082.0	177804.5	12570.9	695	83.606	74.414	.118	42.410	11.860	89.023
2084.0	177432.6	12507.2	810	83.949	70.873	.149	42.554	11.799	89.049
2086.0	177115.8	12444.2	906	84.268	66.447	.181	42.526	11.739	89.431
2088.0	176713.6	12381.8	980	84.618	61.637	.153	42.506	11.680	89.943
2090.0	176286.2	12319.4	1031	84.938	57.344	.014	42.457	11.621	90.545
2092.0	175842.7	12256.9	1065	85.253	53.960	.029	42.395	11.561	91.202
2094.0	175390.1	12201.9	1080	85.564	48.976	.065	42.306	11.509	92.008
2096.0	174937.2	12139.5	1075	85.846	45.108	-.078	42.143	11.450	92.705
2098.0	174490.3	12076.4	1061	86.118	43.398	-.022	41.949	11.391	93.371

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 * ST19BET USING FLAIR19, INERTIAL-BTI 9D19, NP0264 DYN. DATA.

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TIME (SEC)	ALTITUDE (FT)	VELA (FPS)	GAMA (DEG)	HOGA (DEG)	SIGMA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
2100.0	174054.0	12012.4	-1.040	86.386	43.051	-0.058	41.824	11.330	93.986
2102.0	173627.4	11947.6	-1.024	86.657	45.907	-0.238	41.783	11.269	94.552
2104.0	173205.8	11881.7	-1.023	86.947	47.882	.154	41.616	11.207	95.079
2106.0	172787.0	11815.3	-1.020	87.233	47.265	-940	41.392	11.145	95.588
2108.0	172371.0	11746.6	-1.021	87.524	48.530	-0.018	41.257	11.082	96.077
2110.0	171955.2	11676.0	-1.026	87.804	48.696	-125	41.969	11.014	96.467
2112.0	171540.5	11607.2	-1.030	88.103	49.109	-0.059	40.907	10.949	96.909
2114.0	171124.3	11541.3	-1.041	88.400	49.398	-104	40.725	10.887	97.405
2116.0	170706.0	11474.3	-1.051	88.703	49.675	-137	40.933	10.825	97.886
2118.0	170285.5	11406.9	-1.063	89.009	49.722	-0.081	40.839	10.762	98.368
2120.0	169862.4	11339.9	-1.074	89.314	49.137	-1.35	40.724	10.699	98.861
2122.0	169437.4	11273.0	-1.084	89.618	46.757	-146	40.662	10.637	99.363
2124.0	169010.7	11206.3	-1.094	89.922	48.559	-183	40.625	10.574	99.871
2126.0	168582.4	11138.1	-1.104	90.233	48.572	-231	40.609	10.511	100.354
2128.0	168153.1	11070.1	-1.111	90.546	49.126	-130	40.602	10.447	100.842
2130.0	167722.7	11002.3	-1.121	90.862	48.824	-0.000	40.518	10.384	101.334
2132.0	167291.2	10935.0	-1.127	91.173	47.531	-226	40.327	10.322	101.837
2134.0	166860.8	10867.9	-1.128	91.482	47.190	-226	40.249	10.259	102.336
2136.0	166432.4	10800.8	-1.129	91.793	47.305	-176	40.175	10.197	102.822
2138.0	166005.7	10733.9	-1.132	92.106	47.732	-116	40.073	10.135	103.301
2140.0	165579.4	10664.2	-1.139	92.413	48.031	-126	39.993	10.070	103.719
2142.0	165152.7	10598.3	-1.148	92.732	48.601	-108	39.932	10.009	104.207
2144.0	164724.4	10532.7	-1.159	93.058	49.288	-141	39.900	9.949	104.705
2146.0	164293.9	10467.0	-1.174	93.393	49.970	-0.054	39.856	9.888	105.207
2148.0	163859.6	10402.1	-1.190	93.731	49.960	-0.054	39.692	9.828	105.735
2150.0	163422.1	10338.1	-1.207	94.071	50.034	-0.028	39.561	9.769	106.293
2152.0	162980.5	10274.7	-1.225	94.415	50.218	-0.023	39.469	9.710	106.878
2154.0	162534.3	10212.3	-1.245	94.762	50.473	-0.024	39.357	9.653	107.499
2156.0	162083.1	10154.9	-1.266	95.107	50.756	-0.036	39.309	9.600	108.248
2158.0	161626.2	10092.5	-1.292	95.467	50.593	.352	39.287	9.543	108.912

ST198ET USING FLAIR19, INERTIAL-BT19019, NP0264 DYN. DATA.

PAGE 37

TIME (SEC)	ALTDE (FT)	VELA (FPS)	GAMA (DEG)	HDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
2160.0	161164.1	10029.8	-1.301	95.816	45.094	.070	-39.305	9.485	109.592
2162.0	160707.7	9966.6	-1.279	96.142	41.482	.047	-39.174	9.427	110.232
2164.0	160263.9	9903.7	-1.242	96.451	38.046	.022	-38.981	9.369	110.821
2166.0	159837.4	9841.1	-1.195	96.747	36.524	.048	-38.816	9.312	111.335
2168.0	159429.9	9779.0	-1.146	97.040	36.240	.036	-38.634	9.255	111.767
2170.0	159041.1	9714.6	-1.100	97.342	36.865	.002	-38.443	9.196	112.056
2172.0	158668.7	9653.6	-1.062	97.643	38.217	.043	-38.334	9.139	112.342
2174.0	158309.8	9593.1	-1.032	97.955	39.716	.076	-38.257	9.084	112.572
2176.0	157961.2	9533.1	-1.012	98.276	41.156	.052	-38.189	9.028	112.758
2178.0	157620.0	9473.6	-999	98.606	42.573	.021	-38.125	8.974	112.914
2180.0	157283.2	9414.3	-996	98.945	44.057	.012	-38.084	8.919	113.048
2182.0	156947.9	9355.4	-1.001	99.293	45.106	.011	-38.041	8.865	113.178
2184.0	156611.7	9297.0	-1.012	99.646	45.746	.032	-37.953	8.811	113.316
2186.0	156273.1	9239.0	-1.027	100.004	46.373	.004	-37.860	8.757	113.466
2188.0	155930.8	9181.3	-1.046	100.367	46.648	.028	-37.795	8.704	113.636
2190.0	155583.9	9128.1	-1.065	100.732	46.628	.076	-37.672	8.655	113.930
2192.0	155232.6	9070.6	-1.085	101.099	46.686	.097	-37.540	8.603	114.132
2194.0	154876.8	9013.2	-1.106	101.470	46.373	.075	-37.396	8.550	114.350
2196.0	154516.7	8956.3	-1.125	101.836	45.469	.025	-37.192	8.498	114.593
2198.0	154153.4	8899.5	-1.139	102.169	44.696	.040	-37.028	8.446	114.848
2200.0	153788.5	8842.4	-1.148	102.563	44.291	.015	-36.902	8.393	115.094
2202.0	153423.0	8785.4	-1.156	102.924	44.168	.081	-36.722	8.341	115.339
2204.0	153056.9	8726.9	-1.167	103.289	45.403	.382	-36.516	8.289	115.592
2206.0	152687.4	8672.9	-1.195	103.668	48.429	.565	-36.340	8.238	115.866
2208.0	152308.9	8615.0	-1.234	104.055	46.516	-1.091	-36.125	8.185	116.126
2210.0	151921.8	8559.9	-1.271	104.441	48.440	.080	-36.093	8.135	116.497
2212.0	151524.3	8505.2	-1.317	104.831	48.160	.022	-36.436	8.085	116.920
2214.0	151117.7	8447.2	-1.348	105.235	47.826	.077	-36.243	8.032	117.289
2216.0	150702.5	8393.8	-1.392	105.624	47.467	.101	-35.404	7.983	117.824
2218.0	150276.8	8340.4	-1.434	106.016	47.333	-0.043	-35.632	7.933	118.402

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 * ST198ET USING FLAIR19, INERTIAL-BT19019, NP0264 DYN. DATA.
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TIME (SEC)	ALTUE (FT)	VELA (FPS)	GAMA (DEG)	HDGA (DEG)	SIGMAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
					BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
2220.0	149841.8	8236.9	-1.474	106.410	46.615	.104	35.469	7.886
2222.0	149396.5	8234.0	-1.506	106.798	45.214	.045	35.341	7.838
2224.0	148949.1	8182.4	-1.534	107.168	43.994	.013	35.283	7.792
2226.0	148495.3	8130.2	-1.557	107.545	43.167	.005	35.148	7.744
2228.0	148037.9	8078.5	-1.578	107.921	42.620	.022	34.827	7.698
2230.0	147577.9	8026.6	-1.594	108.300	42.434	-.015	34.835	7.631
2232.0	147116.4	7974.1	-1.610	108.689	42.977	.183	34.797	7.604
2234.0	146652.7	7921.9	-1.629	109.083	42.353	.249	34.631	7.556
2236.0	146187.2	7870.2	-1.642	109.470	41.120	-.079	34.449	7.510
2238.0	145721.6	7821.9	-1.648	109.883	40.514	.101	34.294	7.467
2240.0	145256.1	7769.2	-1.648	110.264	40.000	.087	34.148	7.419
2242.0	144797.8	7716.0	-1.646	110.654	39.758	.089	33.943	7.371
2244.0	144341.2	7662.7	-1.643	111.035	39.366	.133	33.635	7.323
2246.0	143894.3	7609.5	-1.639	111.412	38.877	.134	33.383	7.275
2248.0	143439.3	7556.2	-1.636	111.763	38.802	.010	33.182	7.226
2250.0	142993.6	7503.0	-1.638	112.156	39.622	.038	32.973	7.178
2252.0	142549.0	7442.3	-1.650	112.533	40.510	-.004	32.806	7.123
2254.0	142103.8	7389.7	-1.667	112.918	41.577	-.039	32.754	7.075
2256.0	141656.2	7337.6	-1.691	113.314	42.831	-.082	32.685	7.028
2258.0	141203.6	7286.1	-1.727	113.722	41.874	.644	32.619	6.981
2260.0	140746.7	7234.8	-1.722	114.086	32.649	.165	32.633	6.935
2262.0	140305.3	7183.9	-1.663	114.369	23.039	.193	32.591	6.889
2264.0	139884.1	7134.0	-1.570	114.560	13.174	.177	32.419	6.844
2266.0	139491.4	7085.1	-1.459	114.652	3.000	.155	32.246	6.800
2268.0	139129.0	7041.9	-1.348	114.614	-7.477	.072	32.020	6.760
2270.0	136794.5	6993.6	-1.252	114.498	-18.104	-.004	32.128	6.716
2272.0	138433.0	6944.4	-1.183	114.280	-28.581	-.029	32.183	6.671
2274.0	138185.2	6894.4	-1.161	113.964	-38.934	-.011	32.175	6.625
2276.0	137837.1	6844.4	-1.209	113.557	-48.539	-.460	32.063	6.578
2278.0	137572.7	6795.2	1.308	113.108	-51.068	-.354	31.847	6.533

***** ST198ET USING FLAIM19, INERTIAL-BT19019, NP0264 DYN. DATA. PAGE 39 *****

TIME (SEC)	ALTDE (FT)	VELA (FPS)	GAMA (DEG)	HDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	OA (PSF)
2280.0	137235.7	6747.3	-1.421	112.653	-52.276	-184	31.446	6.489	134.495
2282.0	136873.2	6699.6	-1.547	112.189	-53.397	-180	31.437	6.446	134.689
2284.0	136433.2	6651.7	-1.682	111.712	-54.330	-264	31.625	6.402	135.022
2286.0	136064.6	6601.5	-1.619	111.208	-54.410	-264	31.482	6.356	135.415
2288.0	135616.1	6553.2	-1.954	110.716	-53.694	-322	31.228	6.313	136.040
2290.0	135145.9	6504.8	-2.076	110.227	-51.931	-370	31.088	6.269	136.805
2292.0	134652.0	6456.6	-2.175	109.759	-46.369	-337	30.873	6.226	137.704
2294.0	134143.3	6409.5	-2.246	109.327	-44.948	-92	30.602	6.183	138.733
2296.0	133624.7	6363.4	-2.300	108.923	-43.209	.023	30.343	6.142	139.858
2298.0	133098.6	6317.7	-2.350	108.530	-42.834	.071	30.200	6.102	141.053
2300.0	132566.0	6274.0	-2.399	108.205	-43.141	.135	30.150	6.063	142.377
2302.0	132026.3	6227.8	-2.450	107.74	-43.760	.076	30.060	6.021	143.630
2304.0	131479.4	6180.9	-2.500	107.364	-43.502	.049	29.882	5.980	144.897
2306.0	130928.0	6133.8	-2.542	106.929	-42.147	.047	29.616	5.938	146.193
2308.0	130372.7	6086.9	-2.573	106.495	-40.780	.026	29.318	5.896	147.514
2310.0	129816.4	6039.8	-2.593	106.061	-39.413	.051	29.107	5.854	148.837
2312.0	129261.8	5989.9	-2.605	105.584	-38.545	.067	28.874	5.809	150.004
2314.0	128704.7	5943.6	-2.613	105.152	-38.087	.071	28.548	5.768	151.335
2316.0	128160.6	5898.2	-2.621	104.717	-38.441	.008	28.290	5.727	152.692
2318.0	127613.7	5853.2	-2.634	104.272	-39.305	.041	28.150	5.687	154.054
2320.0	127066.1	5808.6	-2.651	103.813	-40.129	.051	27.981	5.647	155.425
2322.0	126523.2	5764.2	-2.672	103.338	-41.037	.271	27.678	5.608	156.808
2324.0	125978.1	5722.0	-2.699	102.815	-43.045	-1.267	27.366	5.570	158.312
2326.0	125431.2	5678.2	-2.714	102.339	-35.980	-478	27.424	5.531	159.739
2328.0	124893.3	5633.5	-2.667	101.930	-33.412	-100	27.021	5.491	161.054
2330.0	124368.2	5589.7	-2.627	101.533	-33.814	-200	27.310	5.452	162.321
2332.0	123857.7	5544.2	-2.574	101.125	-34.083	-159	26.366	5.411	163.377
2334.0	123356.5	5503.3	-2.567	100.751	-34.094	-083	25.810	5.374	164.633
2336.0	122861.4	5450.5	-2.548	100.430	-35.681	.193	26.179	5.335	165.723
2338.0	122372.6	5416.9	-2.554	99.969	-41.230	.192	26.252	5.296	166.714

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 ST193ET USING FLAIR19, INERTIAL-BIT19019, NPO264 DYN. DATA.
 ***** PAGE 40

TIME (SEC)	ALT DE (FT)	VELA (FPS)	GAMA (OEG)	HDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
2340.0	121633.8	5374.1	-2.589	99.480	-42.240	-.201	25.626	5.257	167.737
2342.0	121339.0	5333.2	-2.643	98.996	-42.330	-.048	25.282	5.220	168.912
2344.0	120890.9	5291.9	-2.697	98.485	-43.688	-.085	25.398	5.183	170.099
2346.0	120335.3	5249.8	-2.755	97.937	-44.836	-.244	25.374	5.145	171.277
2348.0	119673.1	5207.7	-2.818	97.364	-45.326	-.428	25.169	5.107	172.492
2350.0	119354.2	5162.7	-2.878	96.755	-44.403	-.468	24.945	5.066	173.561
2352.0	116830.3	5122.2	-2.925	96.191	-43.304	-.320	24.804	5.030	174.964
2354.0	116302.8	5082.8	-2.968	95.631	-43.000	-.287	24.587	4.995	176.470
2356.0	117771.9	5044.8	-3.010	95.079	-42.507	-.181	24.421	4.961	178.097
2358.0	117236.2	5007.6	-3.051	94.520	-42.865	-.210	24.258	4.927	179.810
2360.0	116701.4	4971.5	-3.092	93.956	-42.675	-.185	24.107	4.895	181.628
2362.0	116161.8	4945.1	-3.126	93.441	-42.451	-.106	23.965	4.873	184.202
2364.0	115619.5	4909.0	-3.167	92.571	-42.633	-.097	23.850	4.840	186.095
2366.0	115074.3	4871.8	-3.210	92.281	-42.964	-.214	23.676	4.807	187.937
2368.0	114526.3	4833.6	-3.252	91.675	-42.616	-.170	23.540	4.773	189.724
2370.0	113976.5	4793.8	-3.288	91.046	-43.109	-.265	23.441	4.737	191.406
2372.0	113425.6	4752.9	-3.324	90.402	-42.609	-.253	23.218	4.700	193.006
2374.0	112874.2	4703.5	-3.359	89.647	-41.606	-.174	22.887	4.655	193.898
2376.0	112323.2	4663.6	-3.390	89.021	-41.582	-.236	22.667	4.619	195.546
2378.0	111772.0	4624.7	-3.421	88.412	-41.130	-.153	22.515	4.584	197.285
2380.0	111221.2	4586.2	-3.443	87.815	-40.912	-.059	22.603	4.549	199.050
2382.0	110672.3	4548.3	-3.462	87.232	-40.744	-.085	22.453	4.515	200.843
2384.0	110124.7	4511.4	-3.486	86.659	-41.446	-.042	22.223	4.481	202.707
2386.0	109577.7	4482.2	-3.509	86.218	-41.760	-.025	22.038	4.456	205.267
2388.0	109030.9	4444.7	-3.538	85.628	-41.820	-.087	21.957	4.422	207.081
2390.0	108483.9	4406.2	-3.576	85.004	-42.790	-.161	21.805	4.387	208.795
2392.0	107936.3	4366.8	-3.612	84.366	-42.029	-.006	21.601	4.351	210.421
2394.0	107388.8	4326.5	-3.642	83.721	-41.499	-.077	21.494	4.314	211.942
2396.0	106842.8	4285.2	-3.671	83.054	-43.246	-.564	21.225	4.276	213.334
2398.0	106297.8	4232.3	-3.698	82.306	-38.355	.333	21.026	4.226	213.528

 J719BET USING FLAIRE9, INERTIAL-BT19019, NP0264 DYN. DATA.

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TIME (SEC)	ALT DE (FT) (FPS)	VELA (DEG)	GAMA (DEG)	HDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
2400.0	105758.1	4192.4	-3.698	81.653	-39.160	.119	20.844	4.190	214.938
2402.0	105224.3	4152.1	-3.671	80.954	-39.741	-.074	21.416	4.152	216.223
2404.0	104701.7	4108.7	-3.641	80.034	-39.427	-.190	20.571	4.112	217.034
2406.0	104137.3	4072.5	-3.630	79.384	-38.660	-.085	20.060	4.079	218.506
2408.0	103678.4	4037.7	-3.626	78.749	-38.355	-.041	19.804	4.047	220.048
2410.0	103174.3	4004.2	-3.627	78.102	-38.568	-.033	19.571	4.016	221.674
2412.0	102673.5	3970.3	-3.643	77.446	-38.864	-.009	19.382	3.985	223.202
2414.0	102174.5	3936.2	-3.668	76.777	-39.537	-.031	19.211	3.953	224.681
2416.0	101676.0	3901.8	-3.701	76.093	-39.727	-.018	19.116	3.922	226.101
2418.0	101177.5	3667.3	-3.736	75.399	-39.667	-.118	19.017	3.890	227.487
2420.0	100676.6	3831.7	-3.777	74.693	-4.0.286	-.054	18.835	3.857	228.732
2422.0	100179.4	3794.8	-3.817	73.967	-4.0.242	-.008	18.722	3.822	229.798
2424.0	99679.9	3758.4	-3.858	73.246	-3.9.934	-.079	18.605	3.788	230.897
2426.0	99160.1	3722.0	-3.898	72.516	-4.0.142	-.089	18.466	3.754	231.971
2428.0	98680.1	3685.4	-3.941	71.762	-4.0.745	-.009	18.326	3.720	232.988
2430.0	98179.3	3648.3	-3.993	70.996	-3.9.995	-.527	18.105	3.685	233.919
2432.0	97679.5	3612.6	-3.987	70.338	-3.0.418	-.011	18.012	3.652	234.982
2434.0	97192.4	3577.0	-3.876	69.853	-2.0.954	-.022	17.811	3.618	235.875
2436.0	96727.9	3542.0	-3.705	69.564	-1.0.796	-.065	17.641	3.585	236.562
2438.0	96292.3	3507.1	-3.487	69.484	-.647	-.142	17.576	3.552	236.890
2440.0	95888.3	3471.8	-3.266	69.607	8.846	-.027	17.478	3.519	236.761
2442.0	95512.7	3436.5	-3.087	69.938	1.8.711	-.045	17.335	3.485	236.252
2444.0	95158.0	3401.1	-2.986	70.477	2.9.008	-.163	17.174	3.451	235.455
2446.0	94611.8	3366.9	-3.004	71.174	3.6.881	-.287	16.862	3.418	234.672
2448.0	94460.6	3333.9	-3.112	71.936	3.9.976	-.065	16.730	3.386	234.078
2450.0	94098.4	3301.3	-3.252	72.754	4.2.528	-.122	16.780	3.355	233.639
2452.0	93722.1	3267.6	-3.409	73.613	4.3.476	-.228	16.796	3.322	233.175
2454.0	93331.7	3233.6	-3.560	74.465	4.2.614	-.105	16.818	3.289	232.737
2456.0	92929.2	3199.5	-3.696	75.316	4.1.779	-.018	16.768	3.257	232.400
2458.0	92515.9	3165.3	-3.829	76.183	4.2.428	-.148	16.633	3.224	232.128

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OF POOR QUALITY

***** ST19AET USING FLAIR19, INERTIAL-BT19D19, NPO264 DYN. DATA.

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TIME (SEC)	ALTITUDE (FT)	VELA (FPS)	GAMA (DEG)	HDGA (DEG)	SIGMA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
					SIGMA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
2460.0	92091.4	3131.5	-3.973	77.051	41.619	.234	16.507	3.191	231.998
2462.0	91656.0	3098.1	-4.110	77.911	40.333	.076	16.407	3.159	231.991
2464.0	91210.3	3064.6	-4.248	78.775	39.886	-.047	16.381	3.127	232.051
2466.0	90754.7	3031.0	-4.382	79.644	40.137	-.057	16.406	3.095	232.166
2468.0	90290.1	2997.2	-4.510	80.525	39.915	-.125	16.359	3.062	232.293
2470.0	89817.5	2963.5	-4.630	81.424	39.249	-.531	16.239	3.030	232.478
2472.0	89336.7	2930.7	-4.780	82.361	42.285	.166	16.085	2.999	232.839
2474.0	88643.8	2898.0	-4.959	83.323	42.363	.017	15.875	2.967	233.321
2476.0	88336.9	2865.3	-5.166	84.349	43.829	-.057	15.823	2.936	233.896
2478.0	87614.0	2831.8	-5.386	85.385	43.859	-.177	16.313	2.904	234.496
2480.0	87279.2	2795.5	-5.537	86.485	43.913	-.182	16.249	2.869	234.700
2482.0	86734.8	2760.4	-5.736	87.578	44.140	-.089	15.488	2.835	235.146
2484.0	86176.1	2726.5	-5.937	88.612	37.243	-.020	15.134	2.802	235.918
2486.0	85610.4	2693.4	-6.043	89.535	34.133	-.131	14.975	2.771	236.838
2488.0	85043.1	2660.3	-6.116	90.459	32.166	-.001	14.884	2.739	237.724
2490.0	84477.4	2627.7	-6.154	91.337	31.136	.007	14.769	2.707	238.625
2492.0	83915.4	2595.7	-6.193	92.217	31.416	.216	14.554	2.677	239.524
2494.0	83356.2	2564.4	-6.231	93.056	29.845	.098	14.408	2.646	240.454
2496.0	82800.7	2533.0	-6.259	93.859	29.223	-.010	14.271	2.616	241.286
2498.0	82249.4	2501.7	-6.291	94.659	29.867	.086	14.140	2.586	242.003
2500.0	81701.9	2470.6	-6.323	95.464	29.483	-.000	14.030	2.556	242.663
2502.0	81156.4	2439.5	-6.343	96.283	28.824	.487	14.141	2.525	243.193
2504.0	80624.3	2407.1	-6.243	97.046	20.518	.421	14.482	2.494	243.288
2506.0	80111.4	2374.1	-6.021	97.580	10.239	.352	14.352	2.461	242.907
2508.0	79625.2	2340.3	-5.775	97.777	1.715	-.103	14.126	2.428	241.959
2510.0	79165.6	2305.5	-5.530	97.828	-.444	.062	14.190	2.393	240.365
2512.0	78733.7	2270.6	-5.254	97.838	-.1.365	.210	14.245	2.359	238.340
2514.0	78329.9	2235.6	-4.988	97.810	-2.564	.171	14.074	2.324	235.869
2516.0	77951.6	2201.5	-4.757	97.740	-3.063	.094	13.795	2.289	233.191
2518.0	77594.9	2168.2	-4.573	97.662	-2.598	.150	13.488	2.256	230.358

***** ST19RET USING FLAIR19, INERTIAL-BT19019, NP0264 DYN. DATA. *****
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TIME (SEC)	ALT&E (FT)	VELA (FPS)	GAMA (DEG)	HGDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
2520.0	77255.5	2136.3	-4.436	97.591	-3.040	-4.422	13.254	2.224	227.545
2522.0	76929.7	2104.6	-4.342	97.574	-1.264	-2.236	12.981	2.192	224.552
2524.0	76613.7	2073.3	-4.295	97.523	-1.768	-2.05	12.747	2.160	221.487
2526.0	76304.8	2043.1	-4.273	97.471	2.019	-3.37	12.652	2.130	218.516
2528.0	76000.9	2011.8	-4.290	97.591	4.904	-0.051	12.435	2.098	215.195
2530.0	75698.7	1980.5	-4.358	97.752	5.263	0.313	12.213	2.066	211.817
2532.0	75395.5	1948.4	-4.459	97.785	1.013	0.274	11.936	2.033	208.231
2534.0	75088.4	1917.5	-4.622	97.793	-0.242	0.526	11.585	2.002	204.894
2536.0	74772.7	1887.7	-4.865	97.765	-1.957	0.601	11.290	1.972	201.815
2538.0	74443.7	1858.6	-5.173	97.710	-2.859	0.606	11.123	1.942	198.998
2540.0	74098.8	1830.1	-5.518	97.670	-3.004	0.670	10.971	1.913	196.396
2542.0	73736.7	1802.3	-5.885	97.608	-3.704	0.636	10.868	1.885	194.073
2544.0	73357.3	1774.3	-6.247	97.524	-4.590	0.372	10.935	1.857	191.805
2546.0	72961.6	1747.5	-6.615	97.438	-4.250	0.135	10.812	1.830	189.900
2548.0	72549.3	1721.8	-6.999	97.397	-3.195	0.082	10.727	1.804	188.328
2550.0	72120.5	1697.3	-7.366	97.420	-2.215	0.341	10.696	1.779	187.135
2552.0	71676.4	1673.4	-7.736	97.387	-3.244	0.281	10.517	1.755	186.117
2554.0	71216.7	1650.4	-8.125	97.316	-3.842	-0.024	10.370	1.732	185.413
2556.0	70741.5	1628.0	-8.499	97.226	-2.258	-0.067	10.410	1.710	184.915
2558.0	70252.1	1606.7	-8.867	97.132	-1.552	-1.108	10.240	1.688	184.761
2560.0	69748.6	1584.8	-9.245	97.012	-1.839	-0.449	10.118	1.666	184.518
2562.0	69231.6	1562.1	-9.614	96.921	0.022	0.822	10.06	1.644	184.168
2564.0	68703.2	1538.7	-9.980	96.996	3.311	-0.054	10.032	1.620	183.688
2566.0	68163.1	1515.0	-10.354	97.165	4.396	0.324	9.968	1.586	183.177
2568.0	67612.8	1490.6	-10.644	97.412	4.842	0.698	10.342	1.572	182.495
2570.0	67057.3	1466.1	-10.983	97.645	3.517	0.527	10.128	1.547	181.754
2572.0	66494.6	1444.4	-11.260	97.862	1.954	0.107	10.213	1.525	181.685
2574.0	65927.7	1424.4	-11.491	98.020	-0.683	-0.225	10.070	1.505	182.007
2576.0	65356.9	1404.6	-11.747	98.232	-0.875	0.079	9.910	1.485	182.386
2578.0	64781.9	1385.9	-11.989	98.409	-2.654	0.358	9.831	1.467	182.003

***** ST19BET USING FLAIR19, INERTIAL-BT19D19, NP0264 DYN. DATA.
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	TIME (SEC)	ALTITUDE (FT)	VELA (FPS)	GAMA (DEG)	HOGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	MACHA (-)	QA (PSF)
2580.0	64203.4	1368.6	-12.217	98.566	-3.328	.387	9.681	1.449	183.971
2582.0	63621.6	1351.6	-12.440	98.669	-2.814	.748	9.518	1.432	185.022
2584.0	03030.9	1334.9	-12.656	98.669	-3.171	.897	9.367	1.416	186.109
2586.0	62449.4	1316.5	-12.919	98.463	-3.913	.591	9.040	1.397	186.726
2588.0	61857.6	1296.8	-13.214	98.072	-4.229	-.043	8.971	1.377	186.940
2590.0	61262.5	1276.6	-13.484	97.836	-1.798	.174	8.900	1.357	186.936
2592.0	60605.3	1257.7	-13.729	97.783	-.262	.755	8.843	1.337	187.267
2594.0	60067.4	1240.3	-13.926	97.776	-1.995	1.001	8.635	1.320	187.990
2596.0	59468.6	1222.8	-14.180	97.587	-3.484	.532	8.443	1.302	188.617
2598.0	58868.4	1204.6	-14.408	97.342	-3.471	.075	8.453	1.284	188.946
2600.0	58268.5	1184.1	-14.637	97.138	-1.578	.265	8.492	1.263	188.476
2602.0	57671.2	1162.8	-14.805	96.963	-2.091	.410	8.519	1.241	187.647
2604.0	57078.6	1140.6	-14.972	96.715	-2.386	.127	8.418	1.218	186.317
2606.0	56491.2	1120.2	-15.113	96.560	-2.886	-.095	8.395	1.197	185.427
2608.0	55909.2	1100.6	-15.233	96.461	-3.086	-.156	8.327	1.177	184.633
2610.0	55332.8	1080.9	-15.381	96.492	-.944	.544	8.258	1.156	183.642
2612.0	54761.9	1061.7	-15.474	96.610	-3.412	.683	8.471	1.136	182.660
2614.0	54199.4	1042.7	-15.493	96.733	-2.758	.853	8.654	1.117	181.547
2616.0	53645.6	1025.3	-15.557	96.844	-2.551	.856	8.187	1.099	180.807
2618.0	53097.7	1008.7	-15.665	97.002	-1.967	.803	7.949	1.081	180.183
2620.0	52553.2	994.3	-15.832	97.025	-1.752	.573	7.824	1.067	180.256
2622.0	52010.7	981.7	-16.016	96.925	-1.556	.165	7.653	1.052	180.395
2624.0	51467.9	967.2	-16.322	96.831	-.018	-.049	7.518	1.035	179.655
2626.0	50922.1	951.8	-16.686	96.697	.315	-.221	7.670	1.018	178.473
2628.0	50374.4	934.5	-17.035	96.654	1.845	-.075	7.926	9.998	176.459
2630.0	49827.0	918.2	-17.295	96.833	1.592	.783	8.080	9.979	174.720
2632.0	49281.3	903.0	-17.556	97.029	-.837	1.391	8.202	9.962	173.240
2634.0	48735.0	892.9	-17.814	97.008	-3.529	1.294	8.200	9.949	173.602
2636.0	48186.3	888.0	-17.830	97.033	-3.117	1.025	9.416	9.943	175.961
2638.0	47652.0	881.9	-17.441	97.108	-.963	.801	9.392	9.935	177.757

 * ST19ET USING FLAIR19, INERTIAL-BT19019, NPO264 DYN. DATA.
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ORIGINAL PAGE IS
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TIME (SEC)	ALTDE (FT)	VELA (FPS)	GAMA (DEG)	HOGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	MACHA (-)	QA (PSF)
2640.0	47129.8	877.4	-17.100	97.314	-.039	.503	8.979	.926
2642.0	46618.2	872.6	-16.893	97.694	4.077	-.061	8.680	.922
2644.0	46115.3	866.9	-16.661	98.168	3.618	.087	8.864	.914
2646.0	45625.7	856.7	-16.262	98.501	2.260	.119	9.016	183.671
2648.0	45153.9	849.3	-15.693	98.921	3.527	.494	9.622	.904
2650.0	44706.4	838.2	-14.982	99.306	3.819	.374	10.080	184.051
2652.0	44237.0	825.8	-14.203	99.765	3.736	.345	9.940	183.670
2654.0	43892.3	814.3	-13.665	99.631	-9.084	.782	9.623	182.338
2656.0	43510.8	805.0	-13.693	98.410	-24.275	.839	9.291	180.111
2658.0	43125.0	797.5	-14.217	96.326	-30.400	.679	8.998	176.748
2660.0	42724.1	793.6	-14.986	93.902	-34.440	.504	9.048	176.245
2662.0	42303.4	790.6	-15.776	91.012	-38.078	.147	9.422	177.445
2664.0	41906.0	790.1	-16.433	87.820	-41.600	.147	9.819	179.113
2666.0	41404.0	792.0	-17.157	84.162	-47.178	.518	10.485	182.098
2668.0	40934.4	792.2	-17.764	79.504	-50.561	.002	10.381	186.332
2670.0	40445.9	792.3	-18.209	74.394	-51.460	-.662	10.173	180.989
2672.0	39447.6	792.4	-13.521	69.293	-50.511	-.755	10.296	193.744
2674.0	34445.6	786.7	-18.644	64.063	-49.509	-.650	10.342	197.595
2676.0	38945.0	783.1	-13.631	58.902	-46.563	-.216	10.461	200.631
2678.0	38450.3	776.0	-13.593	53.949	-46.241	-.228	10.140	200.763
2680.0	37956.9	769.1	-18.710	49.098	-46.540	-.231	10.069	199.610
2682.0	37467.9	762.3	-18.974	44.321	-47.572	-.175	9.784	201.095
2684.0	36972.4	755.3	-19.355	39.405	-48.453	-.282	9.886	201.121
2686.0	36471.0	751.7	-19.868	34.769	-45.062	-.403	9.163	202.962
2688.0	35965.2	748.2	-19.699	30.499	-41.298	-.211	9.572	207.617
2690.0	35463.8	746.3	-19.924	26.307	-44.314	-.179	8.906	204.871
2692.0	34956.4	744.6	-20.132	21.883	-45.462	-.059	9.426	210.543
2694.0	34446.4	742.9	-20.277	17.119	-46.248	-.046	9.459	213.490
2696.0	33936.2	741.2	-20.201	12.284	-43.824	-.121	9.569	216.467
2698.0	33433.4	738.1	-19.796	7.633	-37.497	-.149	9.270	218.547

ST198ET USING FLAIR19, INERTIAL-6Y19019, NPG264, DYN. DATA.

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TIME (SEC)	ALT/DE (FT)	VELA (FPS)	GAMA (DEG)	HOGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
2700.0	32946.5	735.3	-19.162	3.829	-34.559	-0.251	8.681	734	220.693
2702.0	32475.2	732.0	-13.716	1.121	-35.506	-0.263	7.908	729	222.378
2704.0	32009.5	729.4	-19.771	-3.286	-36.307	-0.270	7.715	725	224.442
2706.0	31543.1	726.5	-13.970	-6.734	-37.069	-0.179	7.586	720	226.345
2708.0	31073.3	723.0	-19.161	-10.430	-39.985	-0.101	7.865	715	227.848
2710.0	30600.1	719.7	-19.487	-14.395	-41.589	-0.053	7.853	710	229.506
2712.0	30121.8	716.4	-19.724	-18.661	-43.130	-0.049	8.135	706	231.179
2714.0	29640.6	712.6	-19.874	-23.174	-43.871	-0.022	8.610	700	232.534
2716.0	29161.7	707.5	-19.800	-28.080	-44.330	-0.110	8.662	694	232.942
2718.0	28689.5	701.6	-19.636	-33.025	-41.179	-0.230	8.391	686	232.803
2720.0	28225.7	696.0	-19.361	-37.342	-36.411	-0.259	8.276	679	232.687
2722.0	27774.3	688.9	-13.919	-41.061	-33.888	-0.292	8.090	671	231.486
2724.0	27335.2	681.9	-13.627	-44.716	-34.427	-0.233	7.985	663	230.102
2726.0	26907.2	674.6	-13.535	-48.443	-35.664	-0.278	7.774	655	228.476
2728.0	26432.1	667.3	-13.585	-52.151	-33.432	-0.372	7.934	646	226.722
2730.0	26063.9	659.2	-18.338	-55.643	-30.930	-0.336	8.096	637	224.357
2732.0	25653.8	652.9	-13.340	-58.947	-31.576	-0.164	8.031	630	223.089
2734.0	25247.7	647.0	-18.191	-62.593	-32.714	-0.250	8.254	623	222.025
2736.0	24845.4	641.6	-18.377	-66.104	-33.091	-0.092	8.172	617	221.242
2738.0	24441.9	637.3	-18.543	-69.822	-34.109	-0.022	8.540	612	221.166
2740.0	24039.7	633.0	-18.468	-73.904	-34.966	-0.200	8.888	607	221.074
2742.0	23642.3	630.0	-13.278	-78.170	-34.623	-0.296	9.058	603	221.868
2744.0	23252.4	627.5	-17.820	-82.544	-33.243	-0.186	9.541	599	222.899
2746.0	22867.3	624.4	-17.098	-86.823	-32.437	-0.010	9.368	595	223.400
2748.0	22514.1	622.1	-16.889	-90.834	-32.934	-0.030	8.930	592	224.343
2750.0	22156.4	619.8	-16.470	-94.929	-31.912	-0.155	9.339	589	225.319
2752.0	21811.6	617.8	-15.926	-98.946	-31.767	-0.078	8.838	586	226.381
2754.0	21474.6	617.0	-15.692	-102.994	-32.743	-0.247	8.700	585	228.238
2756.0	21145.2	616.0	-15.232	-107.190	-31.685	-0.566	8.398	583	229.942
2758.0	20824.5	615.3	-14.865	-111.123	-31.179	-0.907	8.047	582	231.801

***** ST19BET USING FLAIR19, INERTIAL-AT19D19, NP0264 DYN. DATA.
***** PAGE 47 *****

TIME (SEC)	ALTUE (FT)	VELA (FPS)	GAMA (DEG)	HDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
2760.0	20510.6	615.0	-14.622	-114.981	-32.040	-1.103	7.677	.581	233.845
2762.0	20200.0	615.5	-14.501	-116.741	-31.752	-1.106	7.559	.580	236.608
2764.0	19841.6	615.0	-14.305	-122.535	-31.851	-0.934	7.805	.579	238.524
2766.0	19539.4	614.0	-14.106	-126.409	-31.824	-1.075	7.147	.578	240.114
2768.0	19285.8	612.8	-14.353	-129.681	-32.063	-0.783	7.057	.576	241.444
2770.0	18973.4	612.7	-15.030	-133.222	-33.435	-0.648	7.067	.575	243.853
2772.0	18650.2	611.9	-15.424	-136.945	-35.139	-0.595	6.987	.574	245.725
2774.0	18317.1	611.3	-15.959	-140.733	-36.424	-0.439	6.879	.572	247.796
2776.0	17971.6	610.7	-16.598	-144.685	-37.749	-0.351	6.903	.571	250.052
2778.0	17613.4	610.7	-17.195	-148.876	-38.898	-0.444	7.046	.570	252.918
2780.0	17244.1	611.4	-17.816	-153.103	-39.917	-0.483	6.818	.570	256.481
2782.0	16862.7	610.9	-18.148	-157.753	-40.012	-0.379	7.224	.569	259.239
2784.0	16476.1	610.0	-18.413	-162.342	-37.294	-0.295	7.383	.567	261.625
2786.0	16090.1	607.9	-13.275	-166.829	-35.270	-0.359	7.029	.564	263.017
2788.0	15705.9	605.0	-18.384	-171.032	-35.167	-0.332	6.734	.562	264.531
2790.0	15318.4	604.1	-18.644	-175.200	-35.708	-0.374	6.882	.559	266.247
2792.0	14928.6	602.4	-13.825	-179.506	-37.700	-0.313	5.868	.557	268.018
2794.0	14522.2	603.3	-23.213	-176.672	-41.215	-0.177	5.954	.557	272.352
2796.0	14091.1	605.0	-21.218	-172.237	-41.704	-0.061	6.467	.558	277.635
2798.0	13645.7	605.0	-21.549	167.371	-39.919	-0.020	6.886	.557	281.551
2800.0	13198.9	602.7	-21.576	162.486	-38.723	-0.093	6.338	.554	283.459
2802.0	12746.4	600.3	-22.039	158.236	-33.960	-0.050	6.096	.551	285.271
2804.0	12296.7	596.9	-21.959	154.334	-30.396	-0.307	5.827	.548	286.155
2806.0	11847.1	593.8	-22.168	151.348	-21.260	-0.163	5.350	.544	287.260
2808.0	11396.5	590.6	-22.048	149.610	-8.263	-0.014	5.213	.540	288.299
2810.0	10955.2	587.0	-21.912	148.548	-5.098	-0.315	5.185	.536	288.839
2812.0	10519.0	583.4	-21.477	148.192	-3.240	-0.423	5.553	.532	289.305
2814.0	10094.6	579.8	-21.103	148.340	5.696	-0.758	5.409	.529	289.680
2816.0	9678.1	574.6	-20.950	148.901	7.038	-0.839	5.371	.523	288.323
2818.0	9269.1	563.3	-20.665	149.445	5.206	-0.682	5.156	.517	285.808

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* JTL98T1 USING FLAIR19, INERTIAL-BT19019, NPO264 DYN. DATA.

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TIME (SEC)	ALTDE (FT)	VELA (FPS)	GAMA (DEG)	HDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
2920.0	5865.4	563.9	-20.019	150.038	7.398	-0.217	5.092	.512	285.106
2822.0	8464.3	560.0	-20.689	150.647	4.273	.010	4.985	.508	284.800
2824.0	8066.6	554.7	-20.680	150.792	0.318	.320	4.658	.503	283.029
2826.0	7675.2	552.8	-20.569	150.530	-2.260	.370	4.513	.501	284.732
2828.0	7233.2	555.7	-20.453	150.005	-2.505	.317	4.566	.503	291.402
2830.0	6894.5	557.5	-20.143	149.666	-1.710	.209	4.425	.504	297.046
2832.0	6511.1	557.3	-19.843	149.332	-1.060	-.341	4.346	.504	300.655
2834.0	6134.0	553.8	-19.443	149.497	1.266	-.452	4.652	.500	300.592
2836.0	5769.6	545.3	-19.051	149.581	1.090	-.539	4.587	.492	294.896
2838.0	5415.3	535.3	-18.850	149.782	1.170	-.546	4.887	.483	287.540
2840.0	5072.4	526.9	-13.716	149.734	.218	-.630	4.742	.475	281.824
2842.0	4733.8	521.3	-13.561	149.746	.985	-.710	5.321	.470	279.004
2844.0	4403.4	516.5	-13.304	149.722	.479	-.690	5.399	.465	276.848
2846.0	4079.7	512.3	-13.165	149.693	.130	-.531	5.244	.461	275.318
2848.0	3758.4	508.9	-18.236	149.755	-.764	-.183	5.331	.458	274.683
2850.0	3436.6	505.1	-13.169	149.799	-.303	.212	5.356	.454	273.541
2852.0	3123.1	500.9	-13.097	149.881	-.909	.524	5.429	.450	271.845
2854.0	2811.0	497.3	-18.088	149.902	-.740	.889	5.387	.447	270.745
2856.0	2500.4	494.7	-13.206	149.866	-1.941	.960	5.289	.444	270.840
2858.0	2187.8	493.1	-13.361	149.805	-.768	1.086	5.481	.443	271.912
2860.0	1872.5	493.4	-18.779	150.038	-.613	1.255	5.482	.441	271.340
2862.0	1549.3	496.8	-18.742	150.153	.406	1.363	6.685	.443	277.485
2864.0	1234.1	498.5	-17.083	150.373	.420	1.193	7.656	.444	281.874
2866.0	965.1	497.3	-14.712	150.554	-.574	1.295	7.202	.442	282.503
2868.0	724.0	493.8	-13.003	150.480	-.1.261	1.364	7.596	.440	281.362
2870.0	516.5	488.4	-11.184	150.353	-.1.091	1.633	7.566	.435	277.877
2872.0	341.5	481.0	-9.197	150.200	-.1.231	1.679	8.137	.429	271.778
2874.0	202.6	472.1	-7.399	150.036	-.1.602	1.629	7.926	.422	263.957
2876.0	91.5	462.5	-6.126	149.814	-.915	1.542	7.967	.413	254.232
2878.0	4.0	449.6	-4.473	149.765	1.282	1.657	8.683	.402	241.181

***** ST19BET USING FLAIR19, INERTIAL-BT19D19, NP0264 DYN. DATA.
***** PAGE 49 *****

TIME (SEC)	ALTDE (FT)	VELA (FDS)	GAMA (DEG)	HDGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
2800.0	-55.7	433.8	-3.007	149.985	2.807	1.562	8.973	.388	225.175
2802.0	-92.6	417.5	-1.832	150.240	1.785	1.093	8.926	.374	208.913
2804.0	-117.9	402.1	-1.442	150.335	2.153	.817	9.197	.360	193.799
2806.0	-138.6	387.4	-1.402	150.522	1.303	.268	9.357	.347	179.917
2808.0	-157.7	372.8	-1.939	150.461	-.062	.030	10.239	.334	166.564
2810.0	-168.5	358.2	-1.621	150.435	-.223	-.130	9.891	.320	153.793
2812.0	-175.8	344.0	-1.108	150.395	-.331	-.105	10.114	.308	141.820
2814.0	-177.8	330.5	-.063	150.345	-.286	-.053	9.937	.296	130.929
2816.0	-180.7	317.4	.028	150.341	-.468	-.016	9.314	.284	120.731
2818.0	-180.7	306.4	.154	150.337	-.845	.120	9.049	.274	112.522
2820.0	-180.7	296.1	.078	150.287	-.1.009	.166	8.864	.265	105.100
2902.0	-161.5	287.3	.086	150.242	-.687	.185	6.977	.257	98.922
2904.0	-181.6	279.6	.129	150.322	-.702	.089	4.828	.250	93.699
2906.0	-182.2	271.6	.106	150.458	-.605	.075	2.374	.243	88.440
2908.0	-183.0	260.6	.372	150.495	-.466	.134	2.540	.233	81.385
2910.0	-182.1	249.1	-.088	150.560	-.524	.038	3.594	.223	74.370
2912.0	-182.3	239.8	.152	150.501	-.333	.308	3.767	.215	68.935
2914.0	-182.3	229.9	.124	150.264	-.450	.129	3.759	.206	63.343
2916.0	-182.3	220.8	.122	150.417	-.499	.177	3.733	.198	58.420
2918.0	-182.6	208.0	.090	150.566	-.504	.265	3.730	.186	51.850
2920.0	-132.7	193.2	.129	150.565	-.361	.479	3.836	.173	44.757
2922.0	-182.7	176.9	.131	150.629	-.336	.568	3.848	.158	37.511
2924.0	-182.7	162.2	.155	150.705	-.363	.788	3.876	.145	31.525
2926.0	-182.5	149.1	.111	150.724	-.348	.742	3.823	.133	26.645
2928.0	-182.9	136.4	.144	150.819	-.293	.825	3.855	.122	22.312
2930.0	-183.1	123.8	.047	150.739	-.271	.871	3.744	.111	18.384
2932.0	-183.2	111.6	.184	150.782	-.288	.905	3.896	.100	14.932
2934.0	-183.2	99.6	.142	150.947	-.307	1.068	3.844	.089	11.902
2936.0	-183.3	88.2	.109	151.246	-.381	.982	3.815	.079	9.336
2938.0	-183.2	77.1	.172	151.425	-.289	1.308	3.874	.069	7.118

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***** ST19RET USING FLAIR19, INERTIAL-6719D19, NP0264 DYN. DATA. *****
 * PAGE 50 *

TIME (SEC)	ALITUDE (FT)	VELA (PSF)	GAMA (DEG)	HOGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
2940.0	-183.1	65.9	.184	151.649	-3.33	1.525	-3.888	.059	5.198
2942.0	-183.0	55.2	.206	151.896	-2.268	1.781	-3.898	.049	3.655
2944.0	-133.1	45.6	.101	152.432	-3.28	2.186	-3.786	.041	2.487
2946.0	-133.0	36.6	.146	152.996	-3.325	2.751	-3.834	.033	1.603
2948.0	-183.0	28.9	.312	153.642	-2.253	3.469	-4.028	.026	.999
2950.0	-182.9	22.0	.222	154.623	-2.276	4.446	-3.828	.020	.579
2952.0	-182.8	12.4	.296	157.826	-2.278	7.874	-3.953	.011	.184
2954.0	-182.7	2.8	.248	-167.947	-1.178	41.975	-3.784	.002	.009
2956.0	-182.4	3.6	.910	-60.975	175.605	30.679	-174.515	.003	.015
2958.0	-182.0	3.4	.236	-63.154	-179.847	33.235	-176.477	.003	.014
2960.0	-182.0	3.4	.485	-61.686	-179.971	31.760	176.789	.003	.014
2962.0	-181.9	3.4	.858	-62.082	179.790	32.152	177.231	.003	.014
2964.0	-181.6	3.4	.550	-62.866	179.971	32.935	176.872	.003	.014
2966.0	-181.8	3.4	.367	-62.450	-179.908	32.519	176.658	.003	.014
2968.0	-181.7	3.4	.722	-62.548	179.868	32.624	177.078	.003	.014
2970.0	-181.6	3.4	.311	-62.341	-179.670	32.417	176.591	.003	.014
2972.0	-181.6	3.4	.668	-62.504	179.893	32.581	177.017	.003	.014
2974.0	-181.5	3.4	.430	-62.949	-179.955	33.020	176.733	.003	.014
2976.0	-181.5	3.4	.616	-62.965	179.925	33.043	176.956	.003	.014
2978.0	-181.4	3.4	.613	-62.828	179.921	32.905	176.958	.003	.014
2980.0	-181.3	3.4	.434	-63.050	-179.967	33.127	176.743	.003	.014
2982.0	-181.2	3.4	.978	-62.875	179.689	32.948	177.388	.003	.014
2984.0	-181.1	3.4	.829	-63.054	179.782	33.126	177.212	.003	.014
2986.0	-181.1	3.4	.591	-63.369	179.939	33.445	176.930	.003	.014
2988.0	-180.9	3.4	.881	-63.197	179.746	33.269	177.277	.003	.014
2990.0	-180.8	3.4	.680	-63.375	179.883	33.449	177.036	.003	.014
2992.0	-180.8	3.4	.675	-63.083	179.881	33.158	177.033	.003	.014
2994.0	-180.7	3.4	.955	-63.083	179.697	33.158	177.367	.003	.014
2996.0	-180.6	3.4	.797	-63.378	179.800	33.455	177.180	.003	.014
2998.0	-180.5	3.4	.837	-63.166	179.775	33.240	177.229	.003	.014

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* 5T198ET USING FLAIR19, INERTIAL-BT19D19, NP0264 DYN. DATA.
* PAGE 51

TIME (SEC)	ALTUE (FT)	VELA (FPS)	GAMA (DEG)	HOGA (DEG)	SIGMAA (DEG)	BETAA (DEG)	ALPHAA (DEG)	MACHA (-)	QA (PSF)
3000.0	-180.4	3.4	.796	-62.477	179.814	32.550	177.177	.003	.014

Appendix D

STS-19 Archival Products

D.1 STS-19 Output Products

(a) FILES

<u>NAME</u>	<u>DESCRIPTION</u>
BT19D19/UN=169750N	Final reconstructed trajectory (40 word format per AMA 81-1)
ST19BET/UN=274885C	Final extended BET (66 word format per AMA 81-11)
NAVBS1A/UN=389102C	STS-19 onboard nav BET (66 word format)
FLAIR19/UN=274885C	Final LAIRS file for STS-19 (ST19MET/UN=712662N with NOAA data below 2.1 kft)
TRWST19/UN=274885C	Reformatted JSC/TRW BET (66 word format)
IMRGA19/UN=274885C	Signal difference file (IMU 2 - RGA1/AA1)

(b) TAPES

<u>REEL</u>	<u>DESCRIPTION</u>
NK0165	STS-19 AEROBET (201 words per AMA 82-9)
NK0201	Duplicate of above
NK0202	25 Hz IMU 2 GTFILE (62 words per AMA 81-20)
NK0203	25 Hz RGA1/AA1 GTFILE (62 words)
NK0222	25 Hz unrectified RGA1/AA1 file
NK0233	25 Hz bias rectified RGA1/AA1 file (input tape for NK0203)
NT0663	Final STS-19 residuals from BT19D19
NR0849	Edited tracking tape
NP0302	1 Hz OI-2 for AEROBET generation
NP0264	20 Hz IMU 2 file in body axes (calibrated from BT19D19 solution, used for ST19BET, AEROBET and GTFILE)
NT0662	Dynamic data for reconstruction (20 Hz IMU 2 data in platform)

D.2 Source Tapes Received via NASA LaRC

(a) T/M TAPES

<u>REEL</u>	<u>DESCRIPTION</u>
NH1178/NR0818	OI-1
NK0785	OI-2
NW0214	OI-3 (source for RGA1/AA)
NW0432	OI-4
NE0227	OI-1 from CBET1F

(b) TRACKING TAPES

ND1229	JSC/TRW tracking data
NE0626	Goddard Space Flight Center data

(c) OTHER

NW0453	JSC/TRW descent BET
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1. Report No. NASA CR-172572	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle Post-Flight BET Products for the 2nd Discovery Entry, STS-19 (51-A)		5. Report Date April 1985	
		6. Performing Organization Code	
7. Author(s) G. M. Kelly, J. G. McConnell, M. L. Heck, P. A. Troutman, L. A. Waters, and J.T. Findlay		8. Performing Organization Report No. AMA 85-5	
		10. Work Unit No.	
9. Performing Organization Name and Address Analytical Mechanics Associates, Inc. 17 Research Road Hampton, VA. 23666		11. Contract or Grant No. NAS1-17707	
		13. Type of Report and Period Covered Contractor Report	
12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Washington, DC 20546		14. Sponsoring Agency Code 506-51-13-06	
15. Supplementary Notes Langley Technical Monitor: Harold R. Compton			
16. Abstract The post-flight products for the second Discovery flight, STS-19 (51-A), have been completed and are summarized herein. The inertial Best Estimate Trajectory, BT19D19/UN=169750N, was developed as discussed in Section I using spacecraft dynamic measurements from IMU2 in conjunction with the best tracking coverage available to date for any of the earlier Shuttle entries. As a consequence of the latter, an anchor epoch was selected which conforms to an initial altitude of greater than a million feet. The Extended BET, ST19BET/UN=274885C, incorporated the previously mentioned inertial reconstructed state information and the LaRC generated LAIRS atmosphere, ST19MET/UN=712662N, with some minor exceptions as discussed in Section II. Primary and back-up AEROBET reels are NK0165 and NK0201, respectively. This product was only developed over the lowermost 360 kft altitude range due to atmosphere problems but this relates to altitudes well above meaningful signal in the IMUs. Section III presents summary results generated from the AEROBET for this flight with meaningful configuration and statistical comparisons from the previous thirteen flights. MMLE files were generated based on IMU2 and RGA/AA, respectively. Appendices attached define spacecraft and physical constants utilized (Appendix A), show plots of the final tracking data residuals from the post-flight fit (Appendix B), list relevant parameters from the BET at a two(2) second spacing (Appendix C), and retain for archival purposes all relevant input and output tapes and files generated (Appendix D).			
17. Key Words (Suggested by Author(s)) STS-19, 51-A, Discovery, Best Estimate Trajectory, Atmospheric Evaluations, Aerodynamic Comparisons, Maneuver Extraction Files	18. Distribution Statement [REDACTED] Until April 1987		
		Subject Category 16	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 148	22. Price